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SEASONAL VARIATION
IN
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LIVESTOCK AND LIVESTOCK PRODUCTS

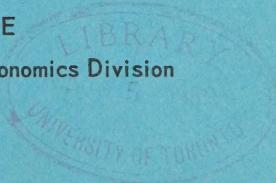
F. M. Schrader and G. E. Woollam



CANADA DEPARTMENT OF AGRICULTURE
Marketing Service

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Ottawa, April, 1953



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The seasonal pattern of prices for agricultural products bears an inverse relationship to the volume marketed. When the volume is seasonally large, a greater quantity is purchased only at lower prices. These lower prices encourage greater consumption as well as storage for future use. At some stage of seasonally rising prices, storage stocks enter consumption. It is in this way that supplies are distributed throughout the year.

The index of seasonal variation is an average of seasonal patterns for a number of years. It may not coincide with the pattern of any particular year but it provides a useful measure of the month to month changes in production and prices which may be expected. A more accurate way of expressing the index would be a range of values together with the probability of the true seasonal index lying within this range. The same end can be achieved by presenting the index (an average) together with its standard error (a measure of dispersion about the mean). The probability is 95 in 100 that the true index lies in the range of ± 2 standard errors of the index.

In Table 1 the seasonal indexes for livestock and livestock products are presented. Standard errors of estimate have been included whenever a sufficient number of observations are available or when trends in data are not pronounced.

Changes in seasonal variation may occur over a period of years in such a way that a trend develops. Thus there may be a tendency for farmers to shift production so that heavier marketings occur later in the season than formerly. An average index of seasonal variation would not reveal such a shift although it may be important to consider such a condition in a current appraisal of seasonal variation.

Seasonal indexes for livestock and livestock products are presented in chart form in the following pages and trend charts have been included for those products in which definite trends in the seasonal index have taken place.

The seasonal pattern of prices is different at various stages of marketing. Retail prices fluctuate much less than wholesale prices, largely because of the relatively fixed costs of retailing. Wholesale prices fluctuate less than farm prices due partly to the relatively fixed charges for transportation, processing and wholesaling, and partly to the influence of storage operations. Emphasis has been placed on price changes although some consideration has been given to the seasonal fluctuations of production and storage stocks.

Direct comparison between retail and wholesale price indexes is hindered by the former referring to first-of-the-month prices and the latter to mid-month prices. Indexes of production and marketings refer to average monthly values.

Methodology. - The trend-cycle components of the time series was removed by dividing the actual data by the centred 12 month moving average. Irregular components of the time series were removed by computing a truncated arithmetic mean of the ratios of actual to moving average values for each month. Each monthly truncated mean was then adjusted so that the total equalled 1,200. The result is the index of seasonal variation.

Standard errors of the indexes were calculated for the seasonal indexes using the formula

$$\text{Standard Error} = \frac{\sqrt{\sum (X - \bar{X})^2}}{n(n-1)}$$

where \bar{X} = the mean of all the index values after eliminating extreme values (truncated mean)

X = index value for each month excluding extreme cases

n = number of observations

Trend charts show the index value for each month in the period from 1921 to 1950. The values obtained for each of the 12 months are plotted and a free hand trend line drawn to show the direction of the changes taking place in the seasonal index. Where the seasonal index is changing, the trend chart should be consulted in order to consider the direction and the degree of the change. Trend charts are included for products with evident changes in seasonal patterns. In some instances, however, sufficient data were not available and trend charts were not prepared. The trend chart has an added advantage in that it shows the year-to-year fluctuation for any one month.

The period 1933 to 1950, excluding the wartime period of controlled prices, was considered of sufficient duration to measure the seasonal pattern.

Seasonal Indexes^{3/} Livestock and Livestock Products, 1933-41 - 1947-50

	Chart : No. :	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Beef													
Inspected slaughter of beef animals	1	99.7 (1.80)	80.8 (1.61)	89.0 (1.51)	84.8 (1.51)	91.8 (2.51)	85.2 (1.30)	89.4 (1.72)	101.9 (.69)	116.3 (2.60)	134.3 (2.84)	134.4 (2.25)	92.4 (1.76)
Price good steers up to 1,050 lb., Toronto	1	96.8 (1.65)	95.1 (1.60)	96.4 (1.19)	103.4 (1.07)	104.5 (1.81)	108.0 (1.40)	105.5 (1.10)	104.0 (1.17)	101.8 (1.09)	93.8 (1.42)	92.1 (1.19)	96.5 (.92)
Wholesale price good steer carcass, Toronto	3	97.7 (1.17)	96.3 (1.45)	98.9 (1.25)	101.2 (.96)	101.8 (1.20)	103.8 (1.30)	104.5 (1.69)	103.5 (.96)	104.1 (.59)	98.4 (1.19)	95.3 (1.53)	96.4 (1.83)
Retail price, round steak, Toronto	5	96.6 (1.66)	97.9 (1.77)	96.1 (.91)	97.5 (.38)	100.0 (.61)	102.7 (.66)	104.8 (.86)	105.1 (.64)	103.4 (.71)	101.5 (.66)	96.8 (.82)	95.2 (.91)
Retail price, stewing beef, Toronto	7	99.5 (.94)	100.9 (.60)	99.0 (.74)	99.2 (.56)	100.0 (.37)	102.0 (.84)	102.1 (.80)	101.2 (.88)	100.1 (.58)	100.3 (.66)	97.4 (.75)	97.4 (.70)
Stocks of beef	9	133.5 (1.89)	126.4 (1.61)	106.1 (1.07)	99.5 (2.43)	88.4 (1.49)	79.2 (1.16)	70.0 (1.20)	69.5 (1.21)	71.2 (1.46)	88.3 (1.78)	119.0 (3.20)	146.0 (3.84)
Hogs													
Inspected slaughter of hogs	11	110.5 (3.14)	99.4 (2.01)	107.8 (2.09)	102.8 (1.23)	103.0 (2.46)	86.3 (2.65)	73.3 (1.66)	74.2 (1.54)	81.8 (2.23)	113.3 (3.38)	127.7 (2.97)	119.9 (3.13)
Price hogs Bl or equivalent, Toronto	11	96.1	96.9	99.9	99.1	99.3	106.3	107.8	106.1	103.6	98.1	92.1	94.7
Wholesale price shop hog carcass dressed, heads off, Toronto	13	97.1 (1.03)	98.1 (1.50)	99.7 (1.31)	98.7 (.80)	98.1 (.92)	104.5 (.82)	106.1 (.96)	103.8 (.72)	103.9 (.65)	97.3 (1.00)	94.7 (1.17)	94.4 (1.23)
Retail price, pork fresh loins, centre cut	15	96.7 (.46)	97.9 (.65)	97.1 (.39)	98.0 (.86)	97.4 (.77)	100.5 (.63)	103.0 (.42)	106.2 (.65)	107.0 (.77)	103.4 (1.24)	99.7 (.76)	96.4 (1.02)
Retail price, bacon side fancy, sliced, rind on, Toronto	17	98.0 (.39)	98.1 (1.24)	98.2 (.85)	97.9 (.35)	97.9 (.34)	97.1 (.42)	99.9 (.75)	102.8 (.69)	103.8 (.90)	103.8 (.69)	101.0 (.94)	98.2 (.59)

- Continued -

a/ Seasonal Indexes - Livestock and Livestock Products, 1933-41 - 1947-50 - Continued

	Chart : No. : Jan. :	Feb. :	Mar. :	April :	May :	June :	July :	Aug. :	Sept. :	Oct. :	Nov. :	Dec.
Hogs (Cont'd)												
Cold storage holdings	19	96.3 (2.85)	103.0 (4.51)	114.7 (3.76)	122.2 (2.35)	127.8 (1.86)	123.1 (3.51)	112.8 (4.07)	92.0 (3.35)	72.8 (2.32)	66.3 (1.64)	78.0 (3.02)
Veal												
Inspected slaughter of calves, Canada	21	53.0 (2.21)	56.4 (2.58)	102.3 (2.17)	149.3 (2.72)	159.5 (3.43)	131.7 (1.58)	113.2 (1.61)	103.5 (1.91)	97.8 (2.69)	97.5 (1.73)	82.6 (2.42)
Price veal calves, good to choice, Toronto	21	110.9	112.0	103.7	100.4	93.6	87.9	87.2	95.2	101.0	101.4	104.0
Lamb												
Inspected slaughter lambs, Canada	22	69.3 (2.56)	57.8 (1.02)	62.0 (1.25)	2.7 (.20)	7.9 (.99)	53.3 (5.35)	96.9 (4.08)	143.3 (3.34)	191.3 (9.62)	266.4 (2.44)	172.7 (3.97)
Price good handweight, Toronto	23	100.1 (1.18)	98.5 (.57)	99.8 (.67)	105.7 (0.42)	112.2 (.68)	118.4 (.81)	109.9 (1.64)	94.0 (1.49)	88.3 (.97)	85.9 (1.03)	89.3 (1.11)
Wholesale carcass price lamb, Toronto	25	97.7 (.97)	94.9 (.66)	96.9 (.82)	103.2 (1.78)	116.3 (3.54)	129.3 (1.50)	113.7 (.90)	97.3 (1.58)	87.3 (1.26)	82.6 (.98)	84.0 (.94)
Milk												
Production of milk b/ Canada	27	65.0 (.50)	62.1 (.26)	74.7 (.55)	93.9 (.75)	123.5 (1.06)	148.5 (1.01)	140.3 (.95)	128.0 (.61)	117.7 (1.03)	100.7 (.85)	77.1 (.66)
Butter												
Production of creamery butter, Canada	28	43.9 (1.05)	38.2 (.81)	49.6 (.90)	75.8 (1.60)	127.8 (1.86)	184.8 (1.65)	174.1 (1.96)	153.7 (1.25)	131.5 (1.96)	104.5 (.90)	65.9 (.64)
Wholesale price butter No. 1 prints, Montreal	28	107.1 (1.19)	107.7 (2.43)	107.2 (3.39)	102.4 (2.19)	92.3 (1.25)	92.6 (.93)	93.7 (1.70)	95.2 (2.30)	97.2 (2.24)	99.2 (1.57)	101.8 (1.08)
Stocks of creamery butter, Canada	29	107.4 (.82)	61.0 (3.40)	53.2 (3.34)	30.1 (3.01)	23.3 (3.96)	40.0 (3.76)	93.6 (1.67)	138.7 (2.25)	163.6 (3.34)	173.0 (3.02)	161.3 (2.15)

- Continued -

a/ Seasonal Indexes - Livestock and Livestock Products, 1933-41 - 1947-50 - Continued

	Chart No.	Jan. :	Feb. :	March :	Apr. :	May :	June :	July :	Aug. :	Sept. :	Oct. :	Nov. :	Dec. :
<u>Eggs</u>													
Wholesale price Grade A Large, Montreal <u>g/</u>	30	92.6	88.0	84.2	78.1	78.7	83.6	94.3	101.9	115.4	132.0	141.6	109.6
Wholesale price Grade A Large, Montreal <u>d/</u>	30	84.1	84.1	87.4	87.4	89.3	96.3	107.6	115.9	119.9	122.9	110.6	91.5
Retail price, Grade A Large, Toronto <u>d/</u>	32	93.6	87.2	88.8	88.4	88.6	89.8	100.8	112.8	112.4	119.0	117.0	105.8
<u>Chickens</u>													
Prices paid by dealers to shippers for Grade A Milkfed, 5 lb. and up, box-packed, Montreal <u>d/</u>	33	98.8	99.3	101.4	103.1	104.6	106.7	104.0	99.6	96.6	94.4	93.5	97.8

a/ Standard error of estimate in brackets.

b/ For period 1941-50.

c/ For period 1936-41 - 1948-50.

d/ For period 1947-51.



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CHART I

SEASONAL INDEXES: I. PRICE LIVE CATTLE
2. INSPECTED SLAUGHTER CATTLE

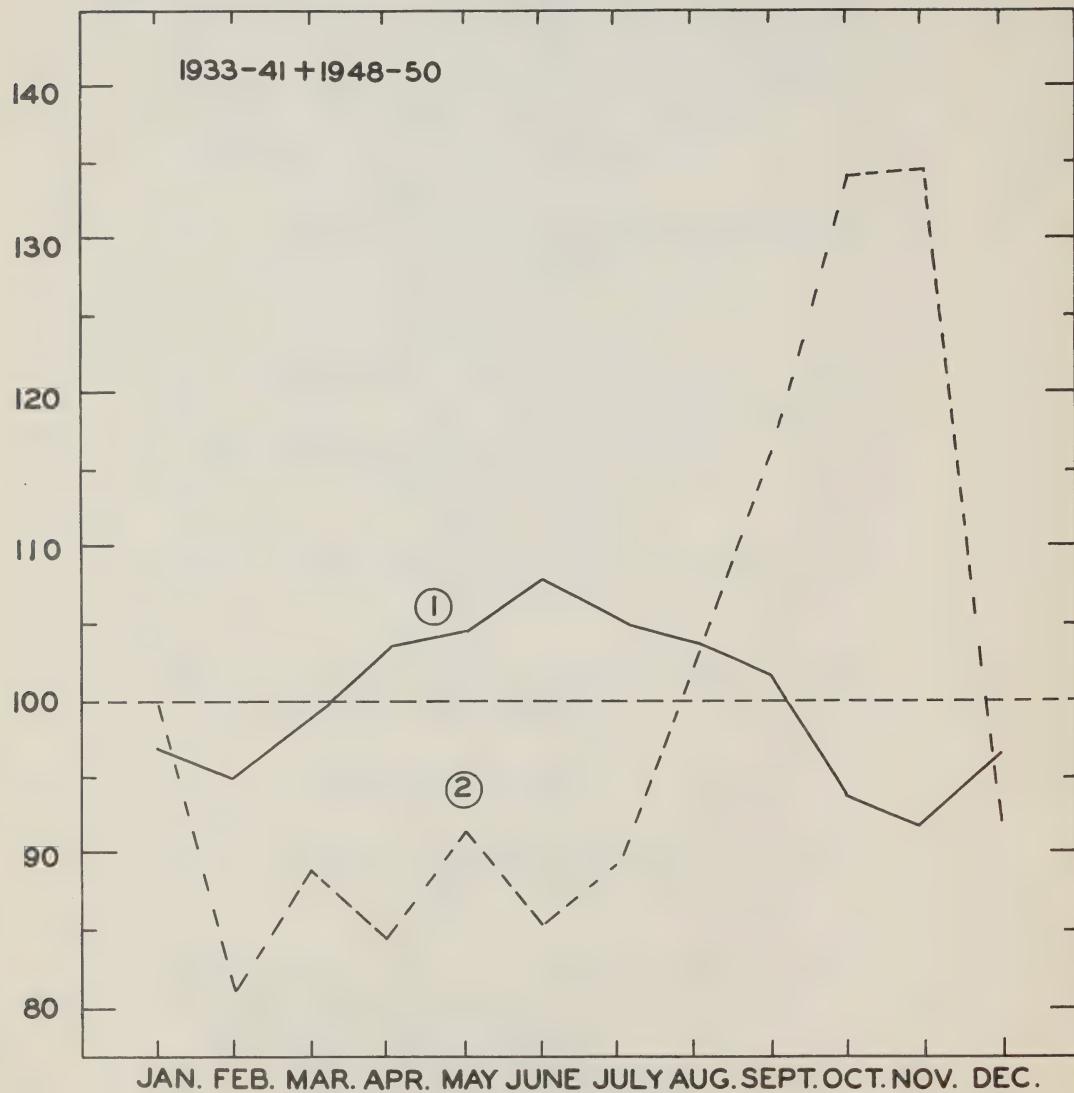


CHART 2

TRENDS IN SEASONAL INDEX: LIVE PRICE GOOD STEERS.

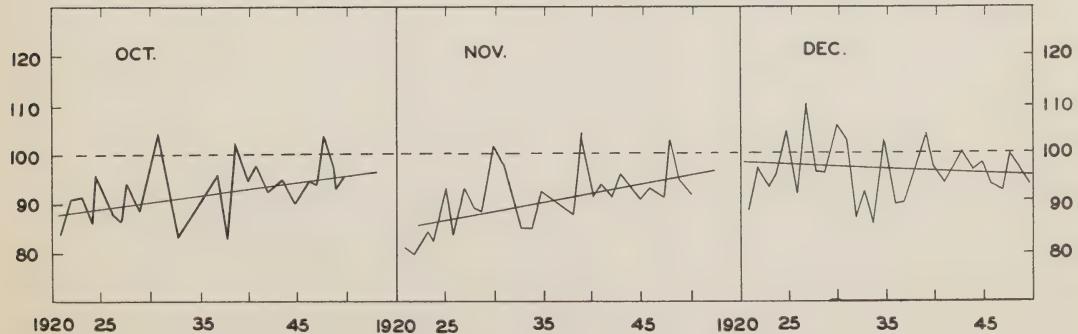
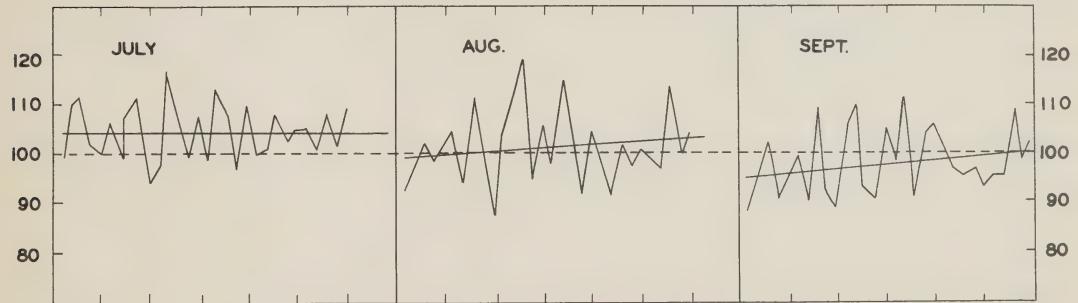
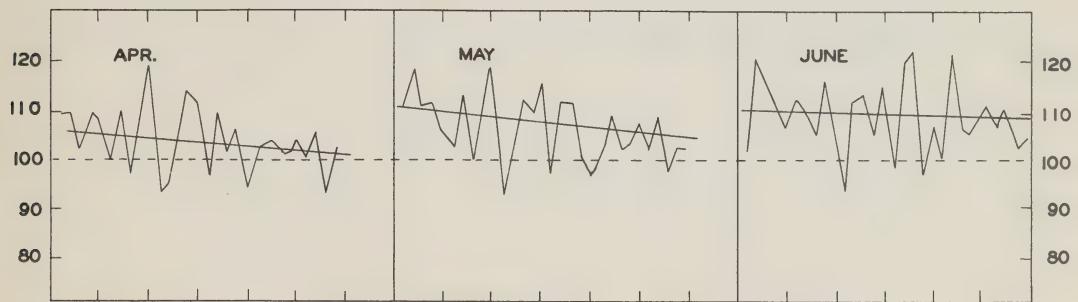
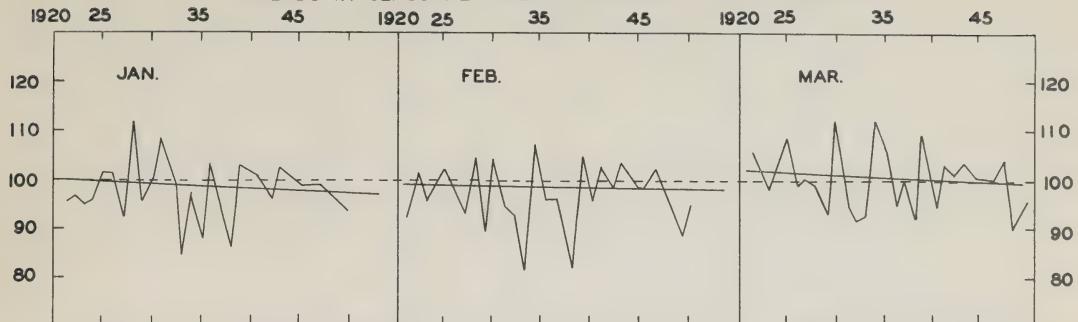


CHART 3.

SEASONAL INDEX: WHOLESALE PRICE-BEEF CARCASS

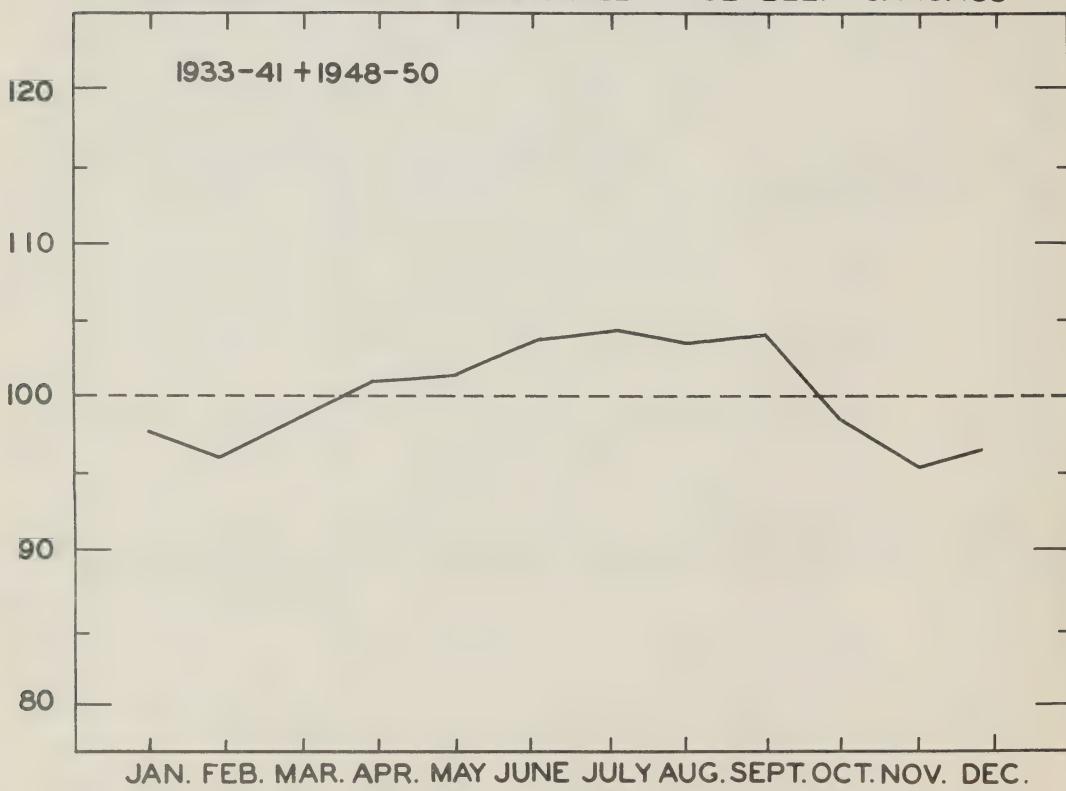


CHART 4.

TRENDS IN SEASONAL INDEX: WHOLESALE PRICE BEEF CARCASS.

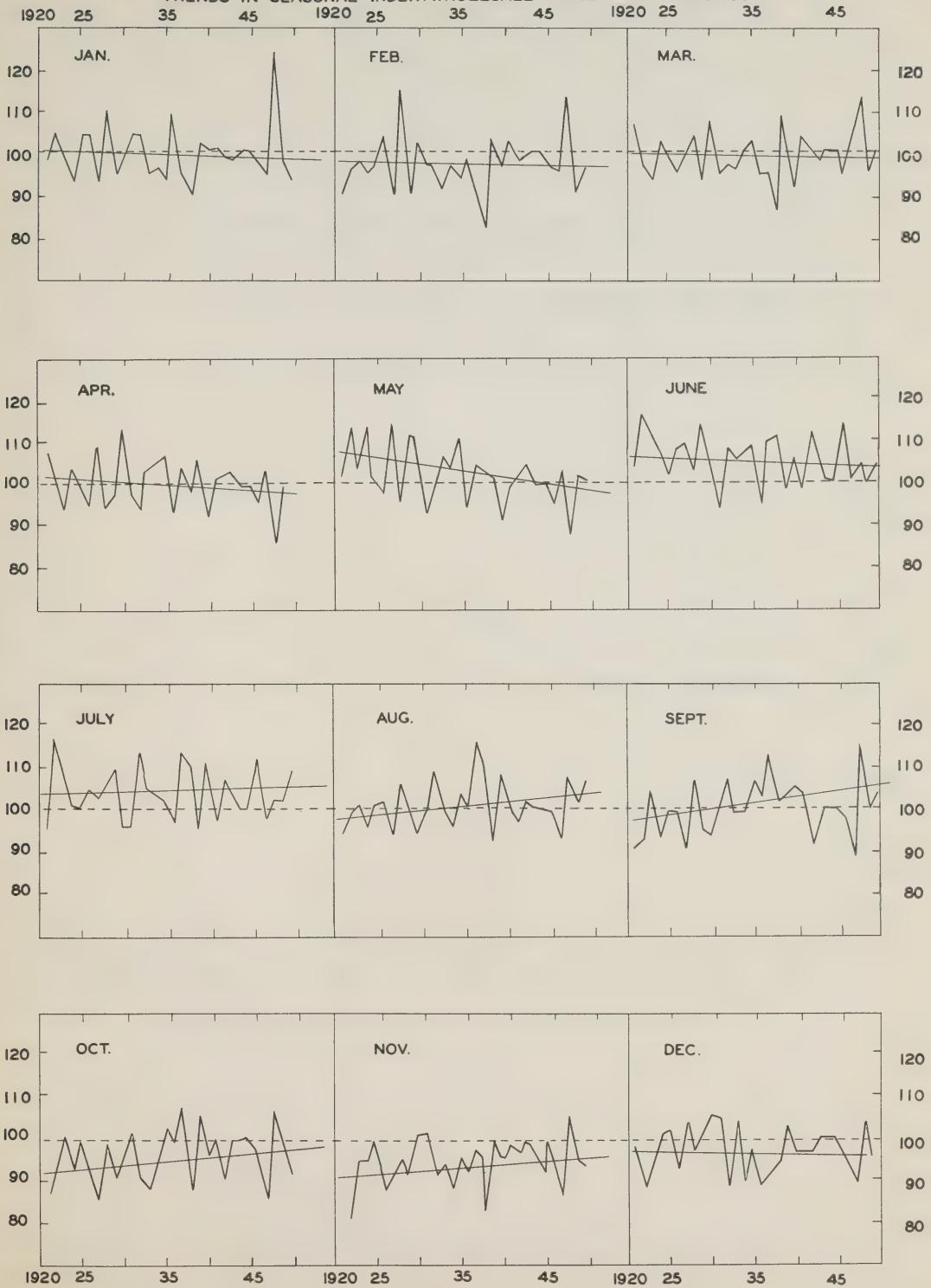


CHART 5

SEASONAL INDEX: RETAIL PRICE-ROUND STEAK

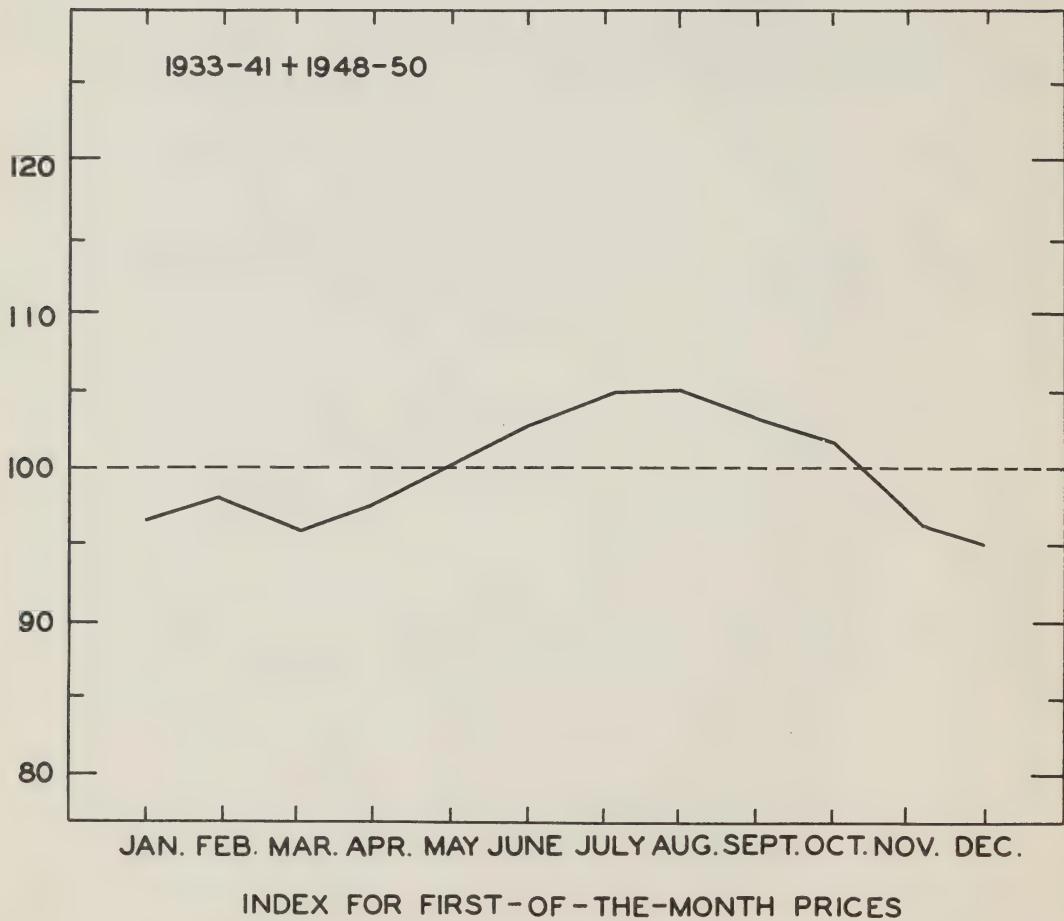


CHART 6.
TRENDS IN SEASONAL INDEX: RETAIL PRICE ROUND STEAK.

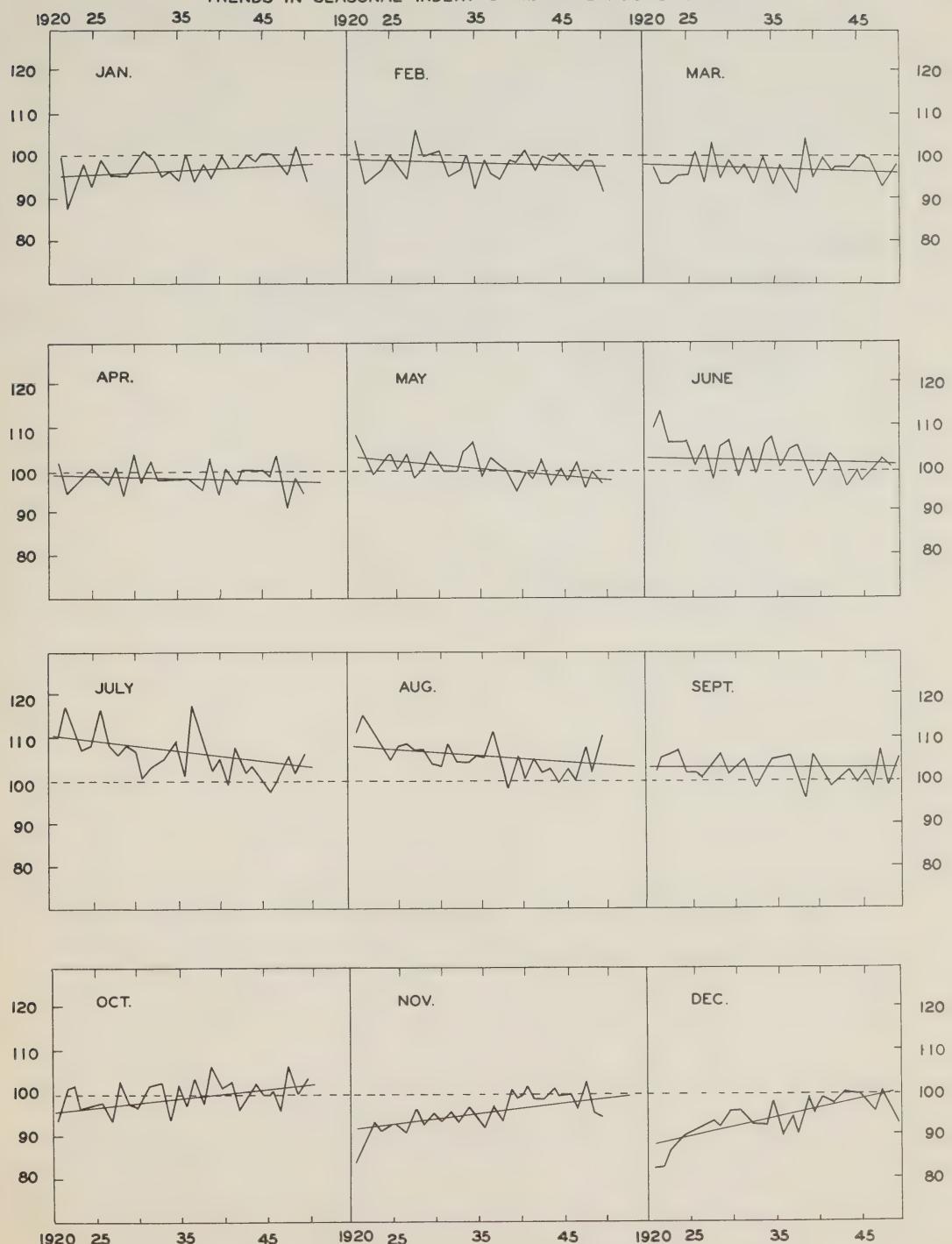


CHART 7.

SEASONAL INDEX: RETAIL PRICE-STEWING BEEF

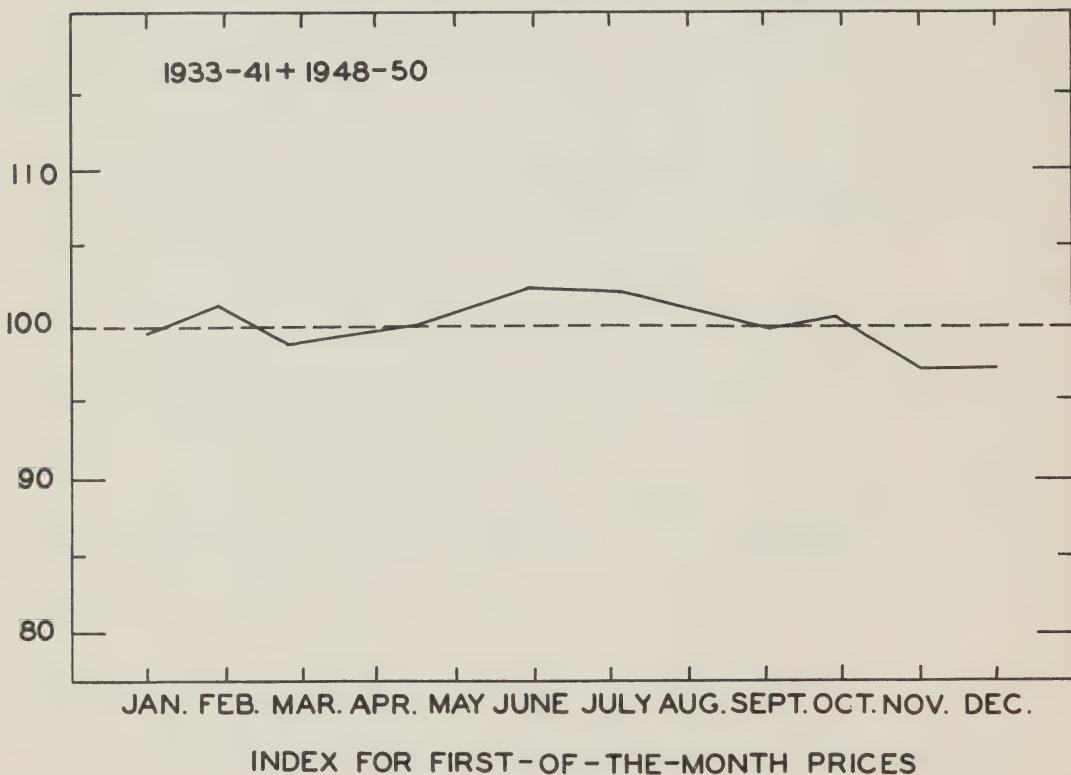


CHART 8.
TRENDS IN SEASONAL INDEX: RETAIL PRICE STEWING BEEF.

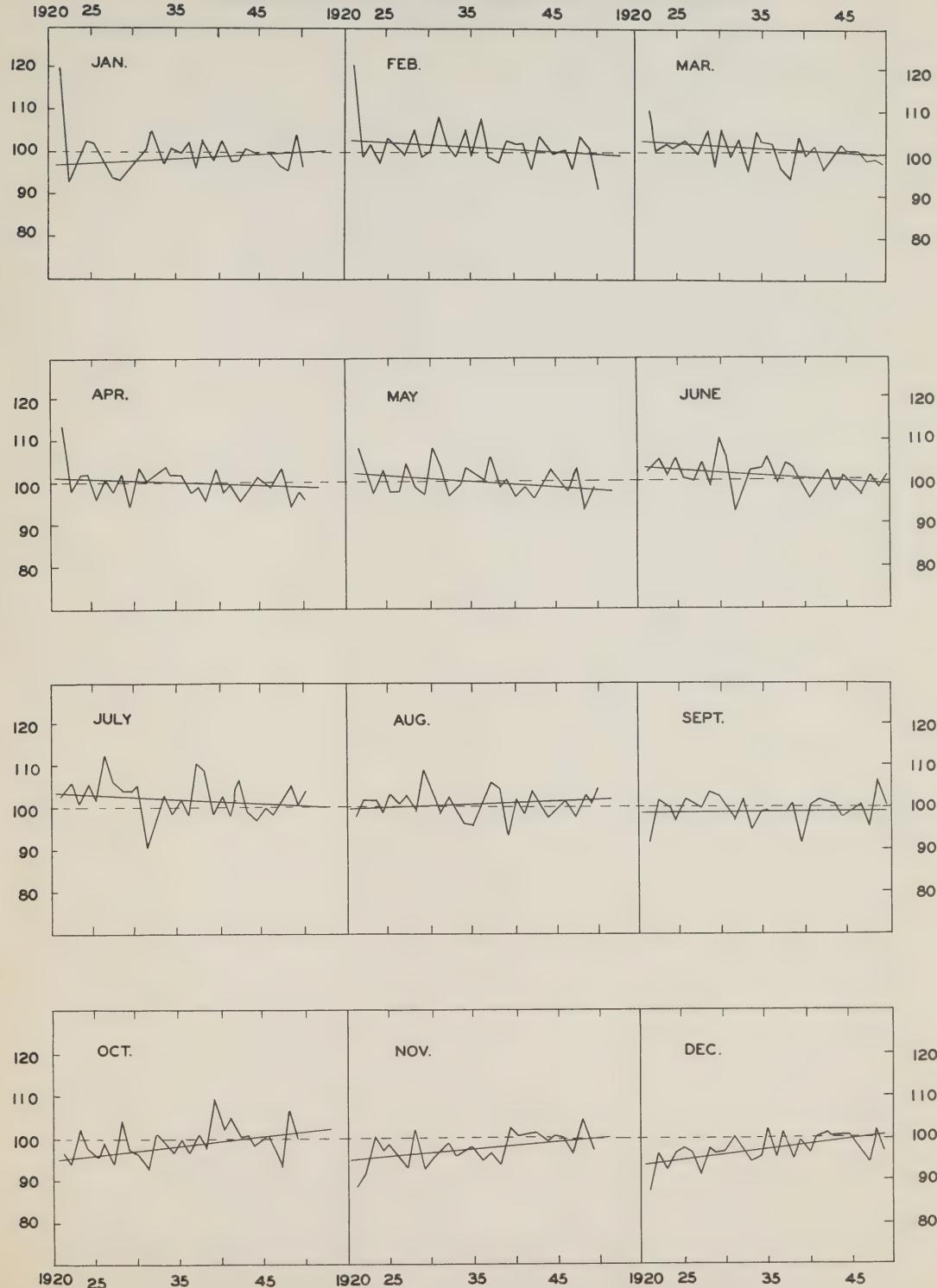


CHART 9.

SEASONAL INDEX: STOCKS OF BEEF

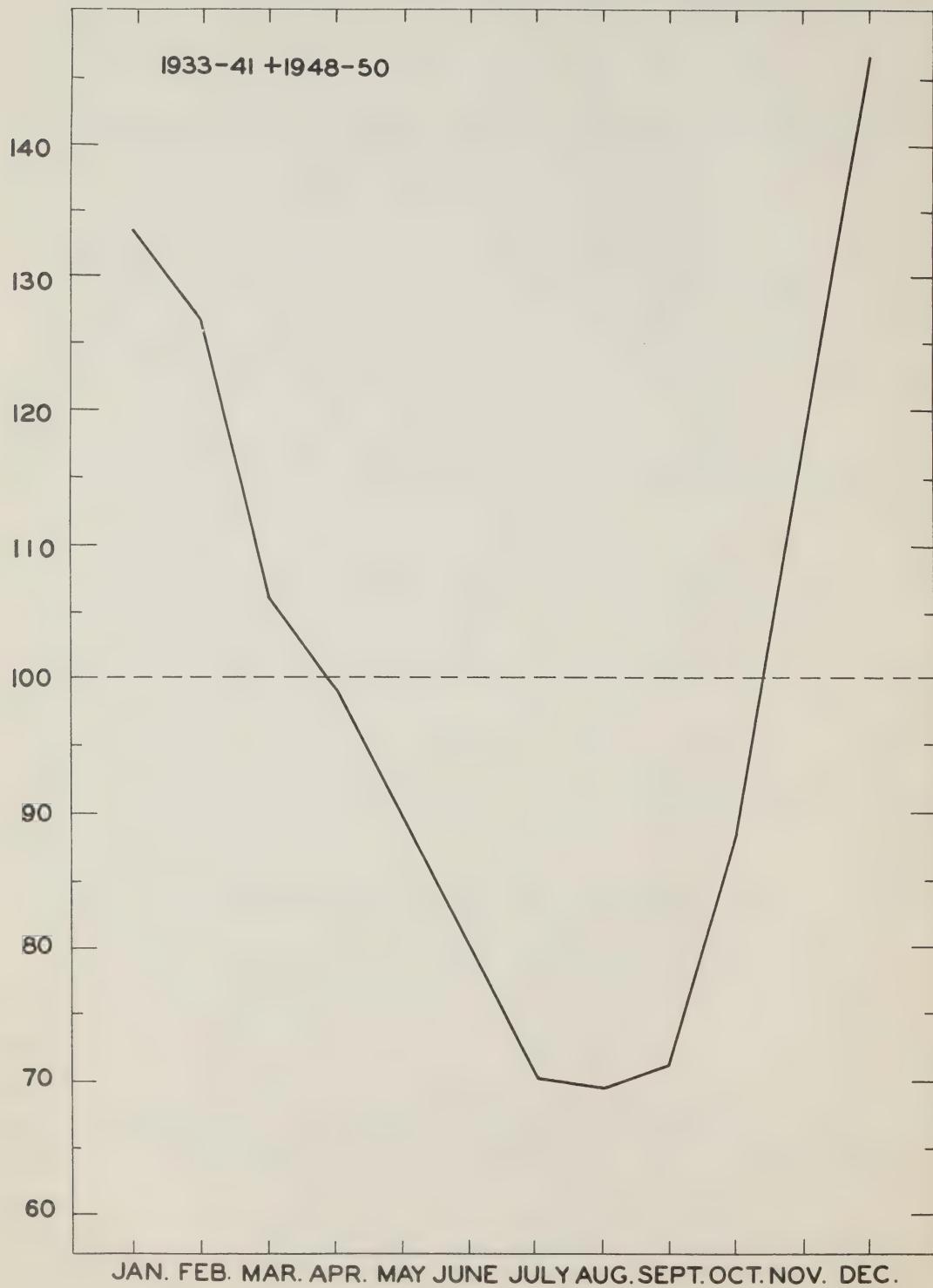


CHART 10
TRENDS IN SEASONAL INDEX: STOCKS OF BEEF

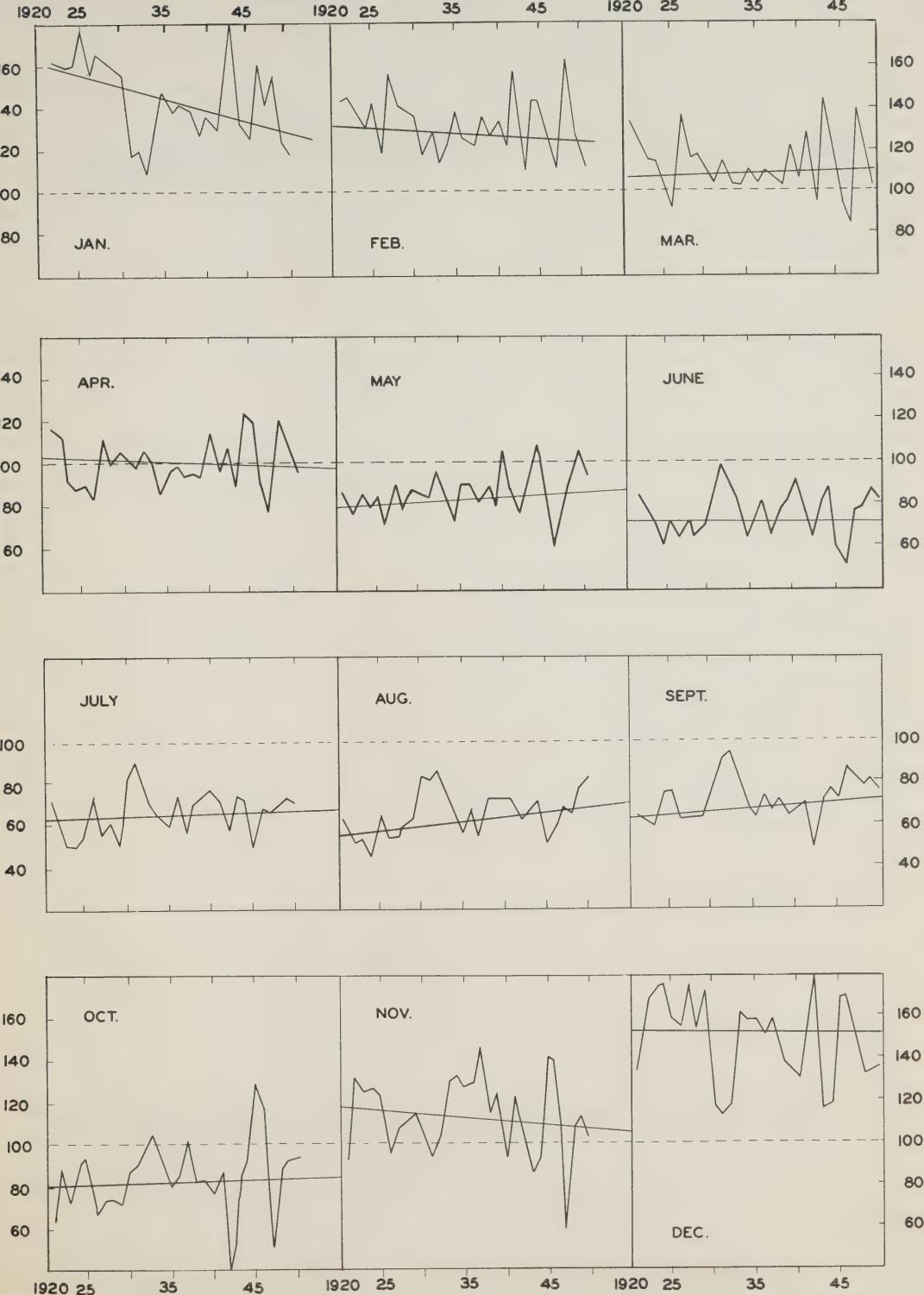


CHART II

SEASONAL INDEXES:

1. PRICE LIVE HOGS.
2. INSPECTED SLAUGHTER HOGS.

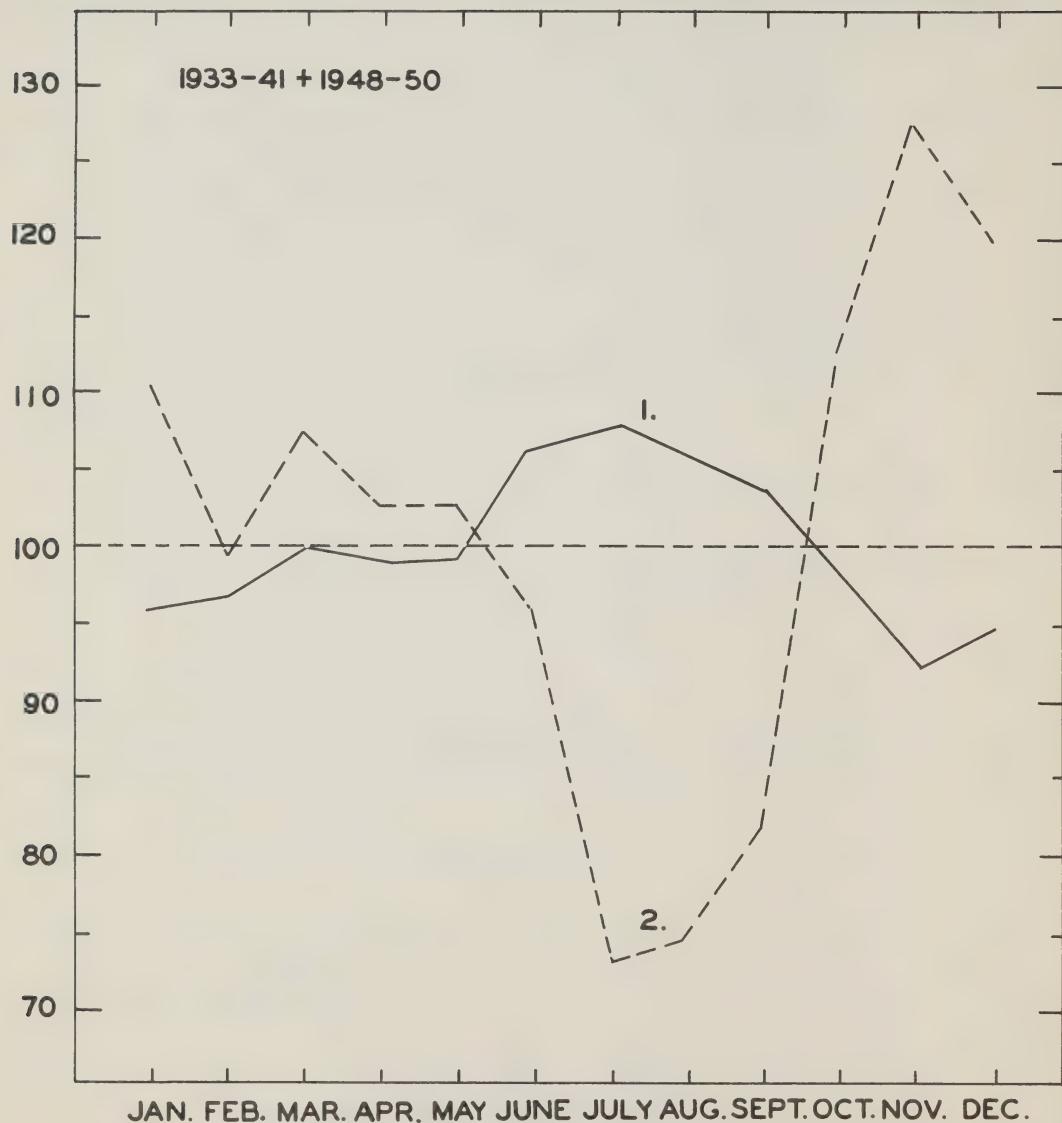


CHART 12.
TRENDS IN SEASONAL INDEX: PRICE LIVE HOGS.

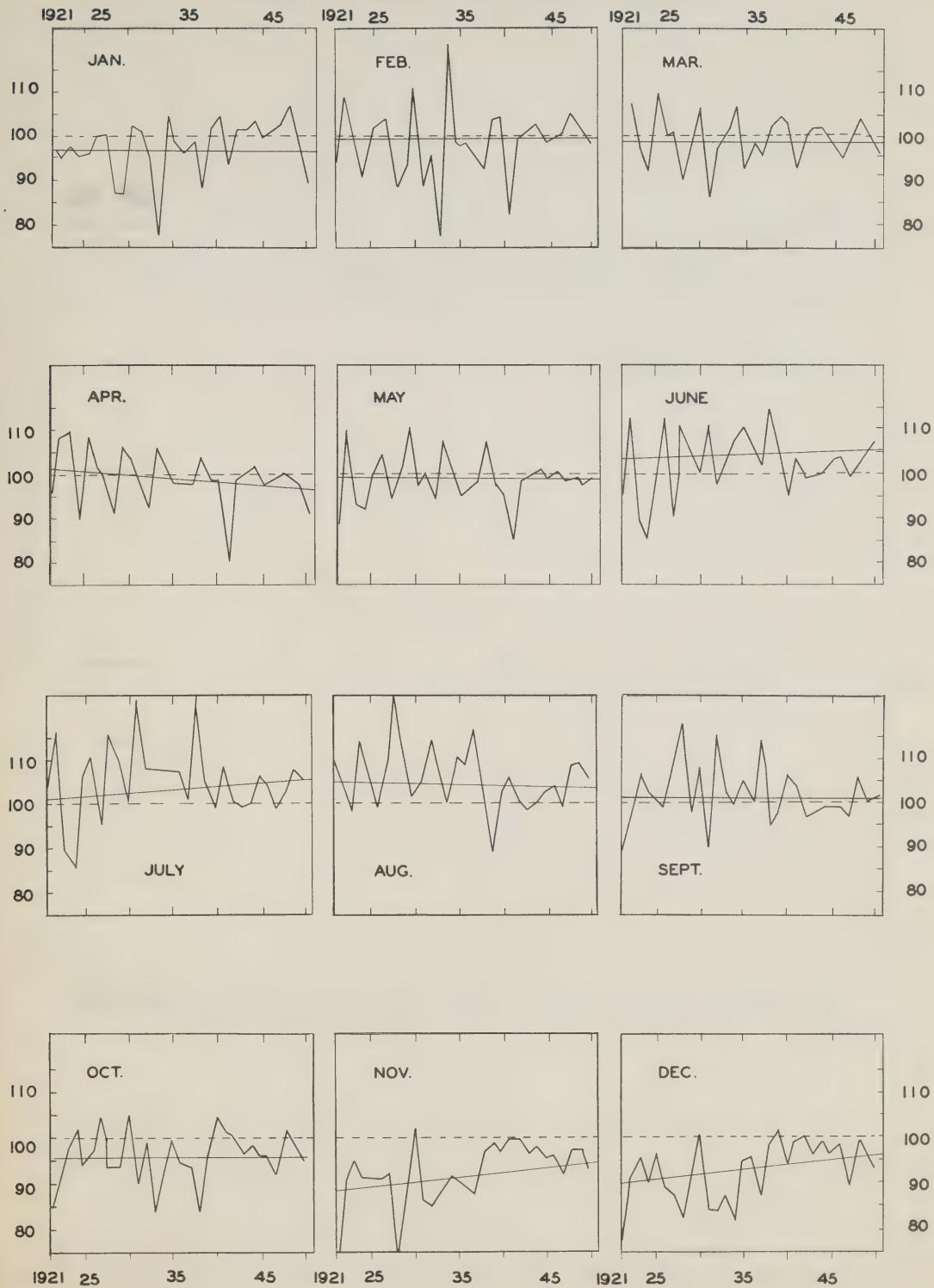


CHART 13.

SEASONAL INDEX: WHOLESALE CARCASS PRICE-SHOP HOGS

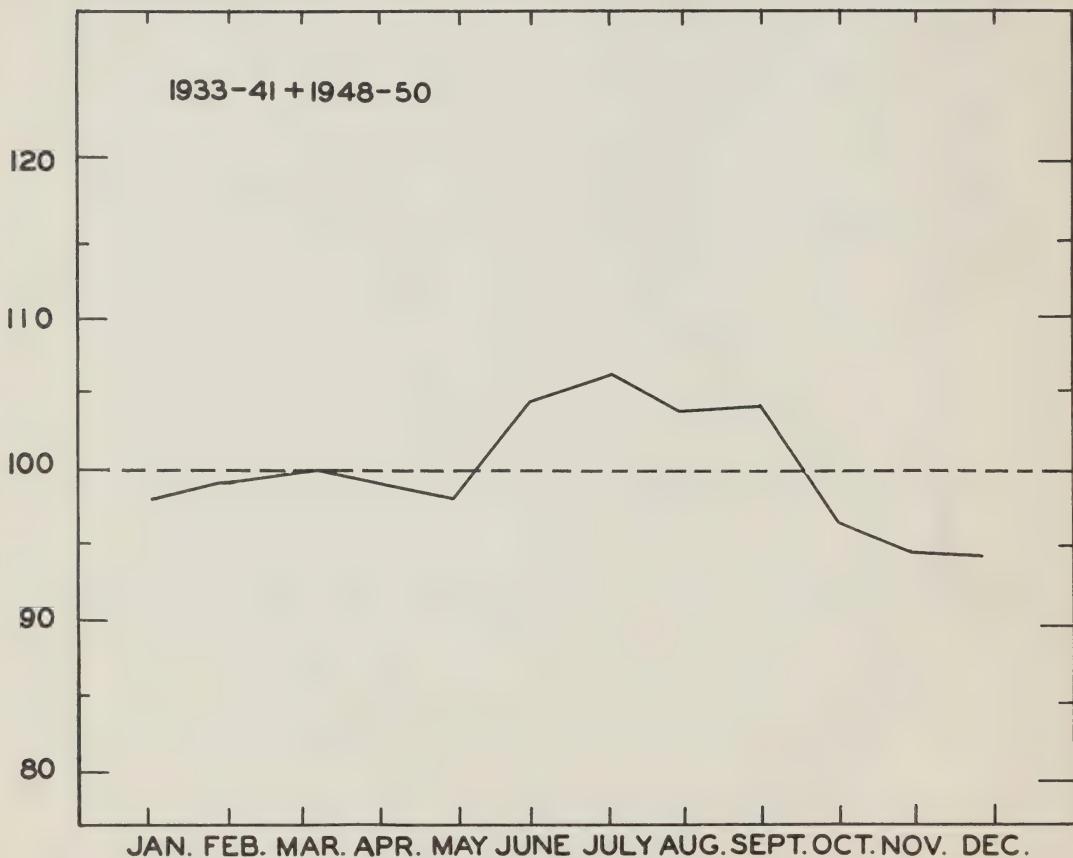


CHART 14.
TRENDS IN SEASONAL INDEX: WHOLESALE CARCASS PRICE OF HOGS [DRESSED]

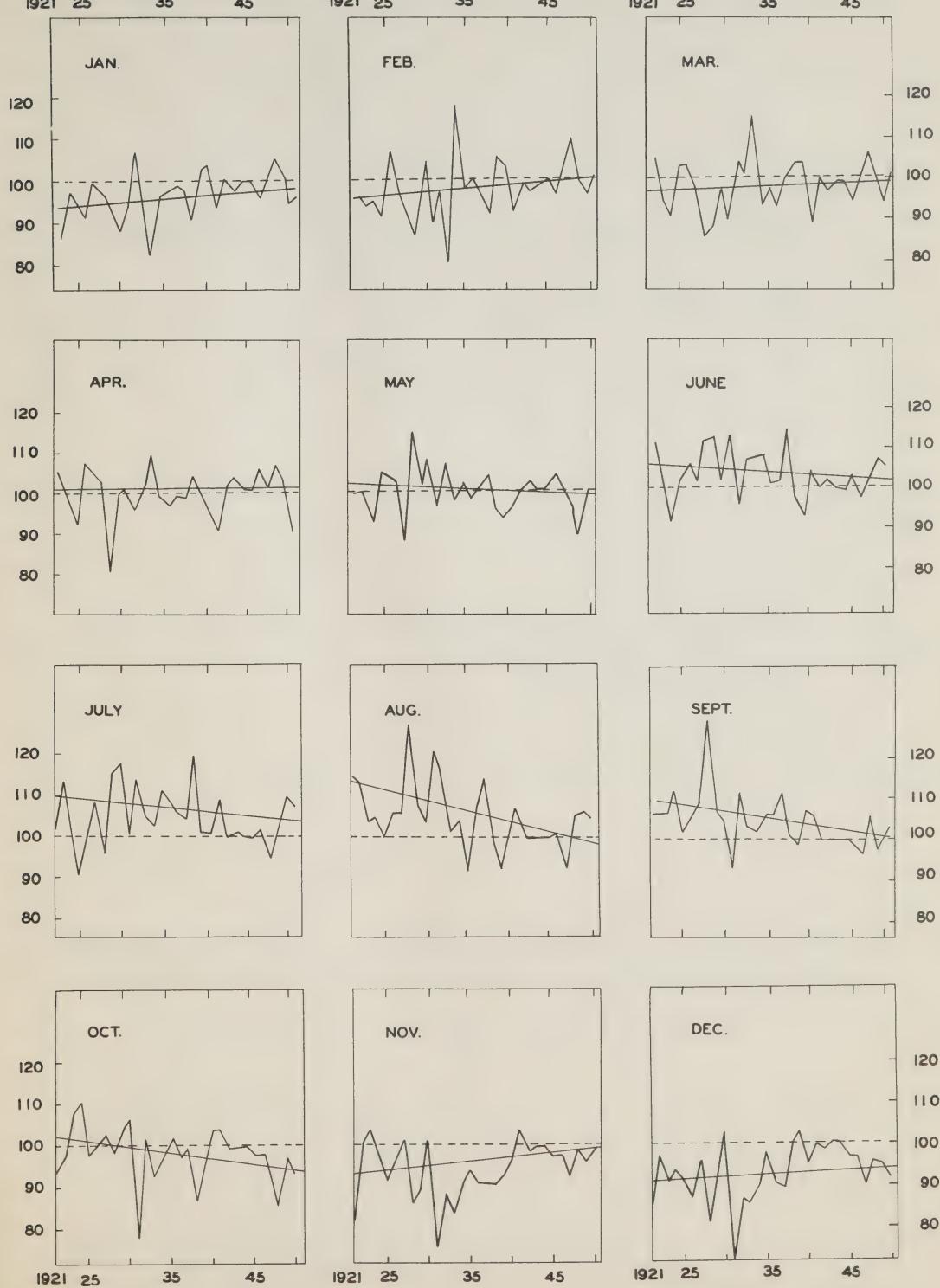


CHART 15.

SEASONAL INDEX: RETAIL PRICE PORK-FRESH LOINS

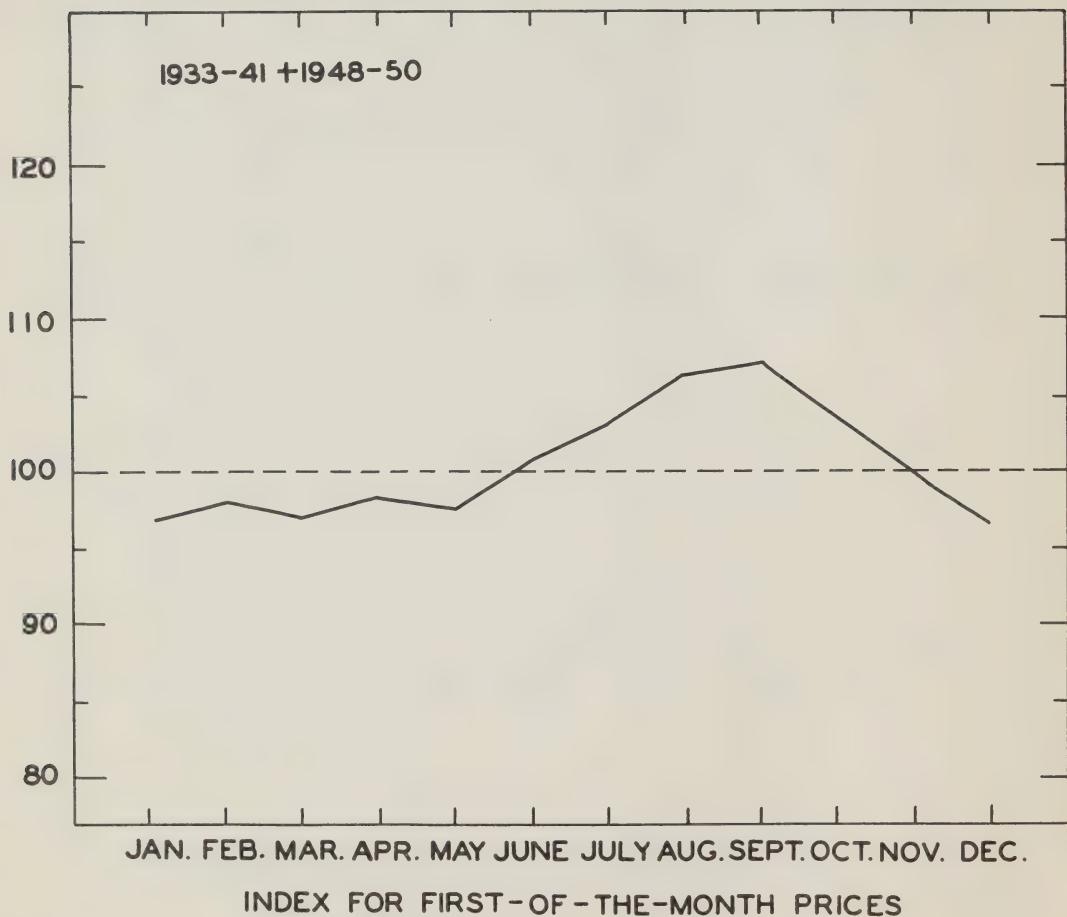


CHART 16
TRENDS IN SEASONAL INDEX: RETAIL PRICES, PORK FRESH LOINS

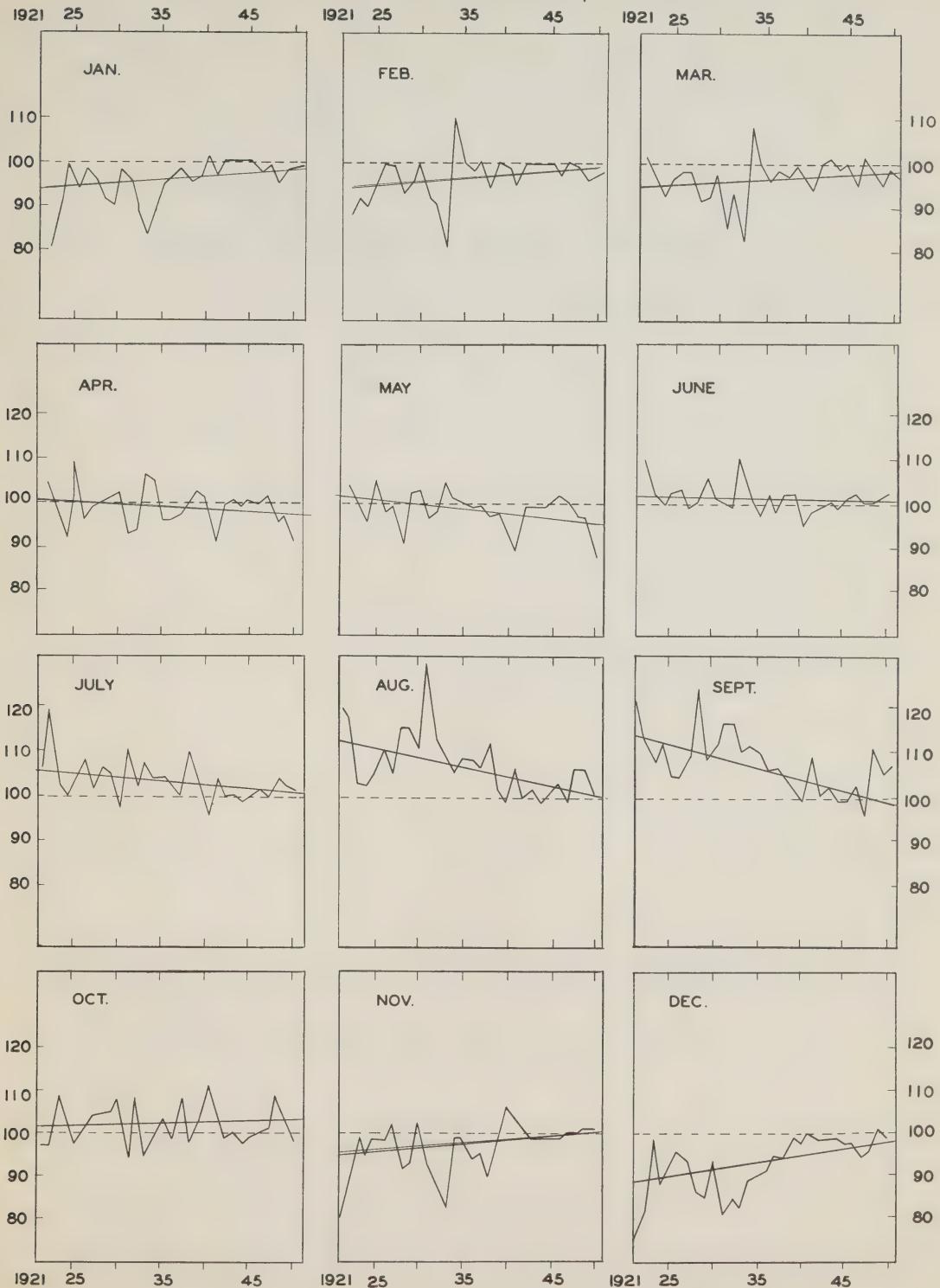


CHART 17.

SEASONAL INDEX: RETAIL PRICE-BACON

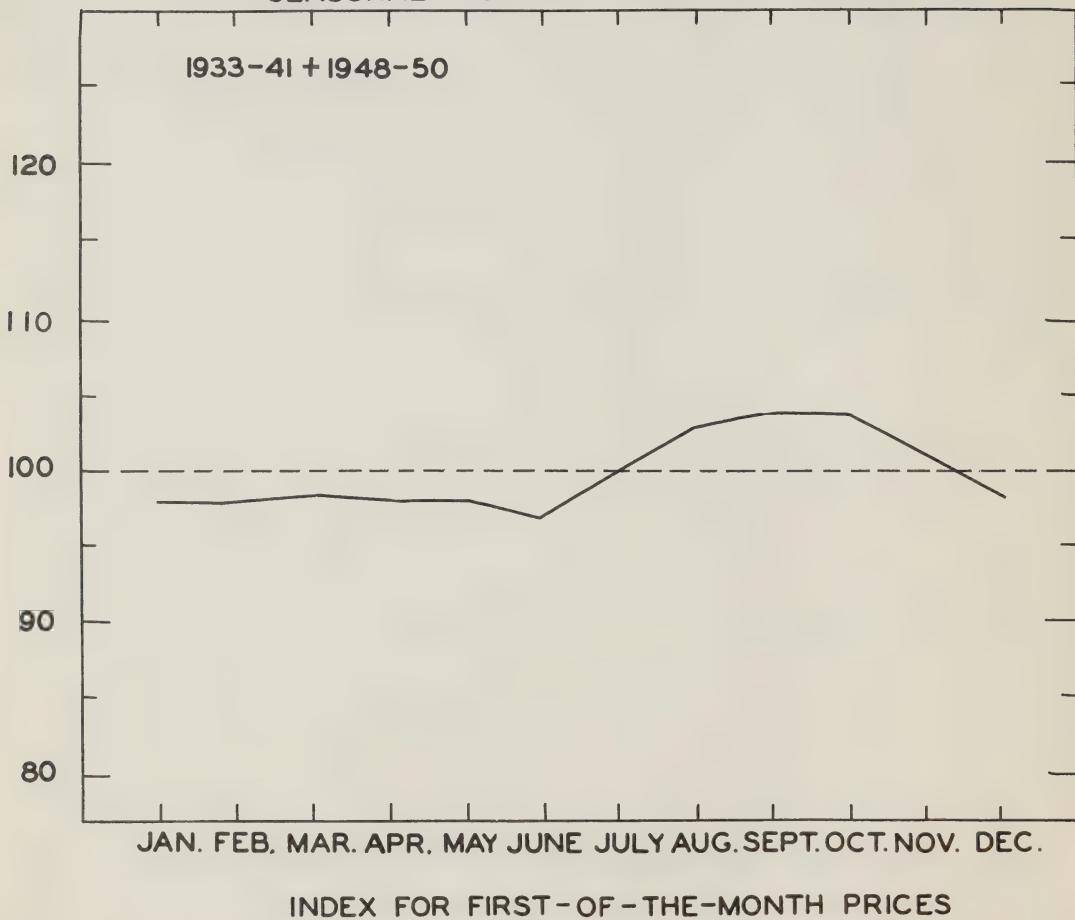


CHART 18.

TRENDS IN SEASONAL INDEX: RETAIL PRICE BACON

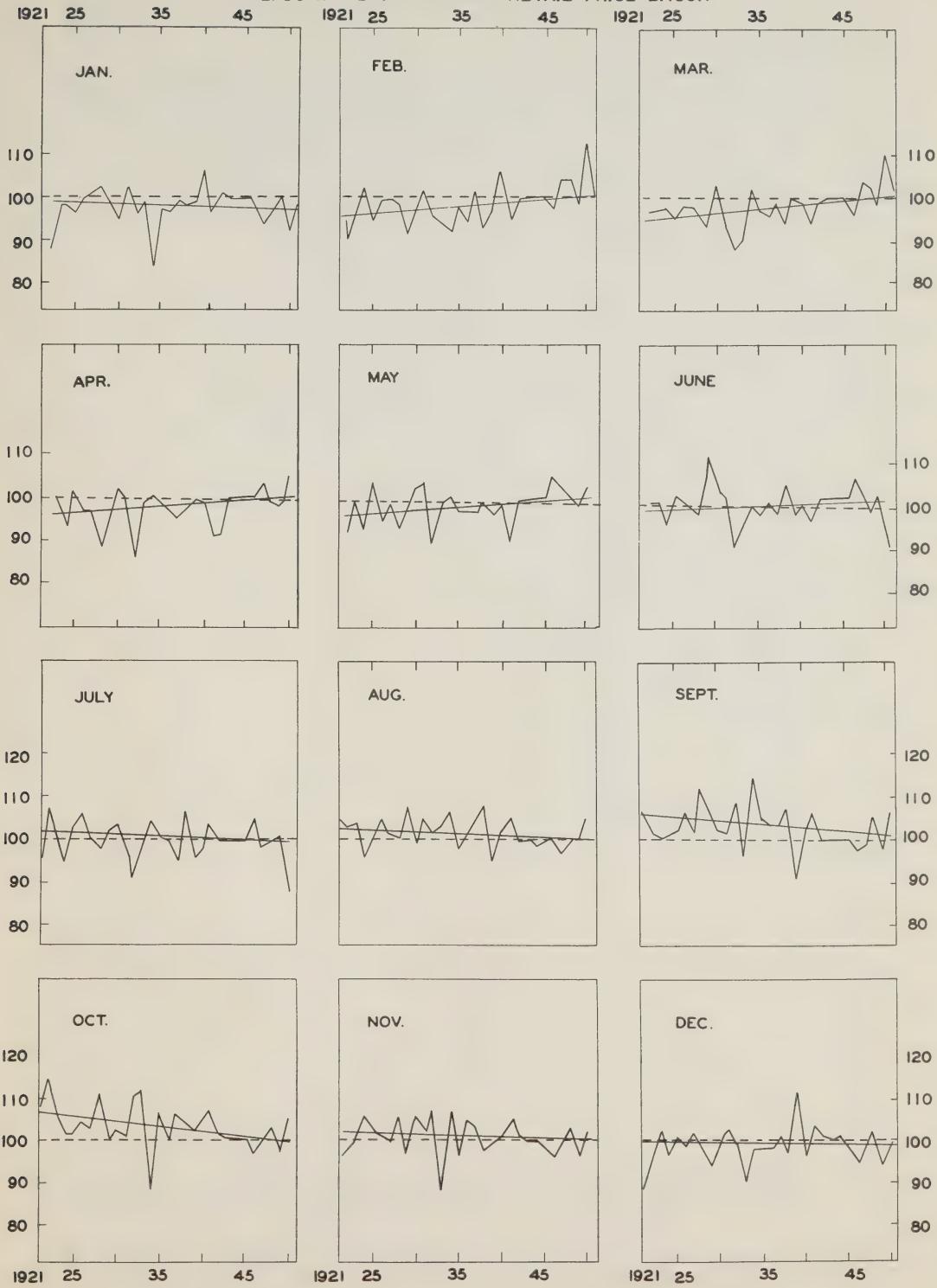


CHART 19.

SEASONAL INDEX: COLD STORAGE HOLDINGS OF PORK

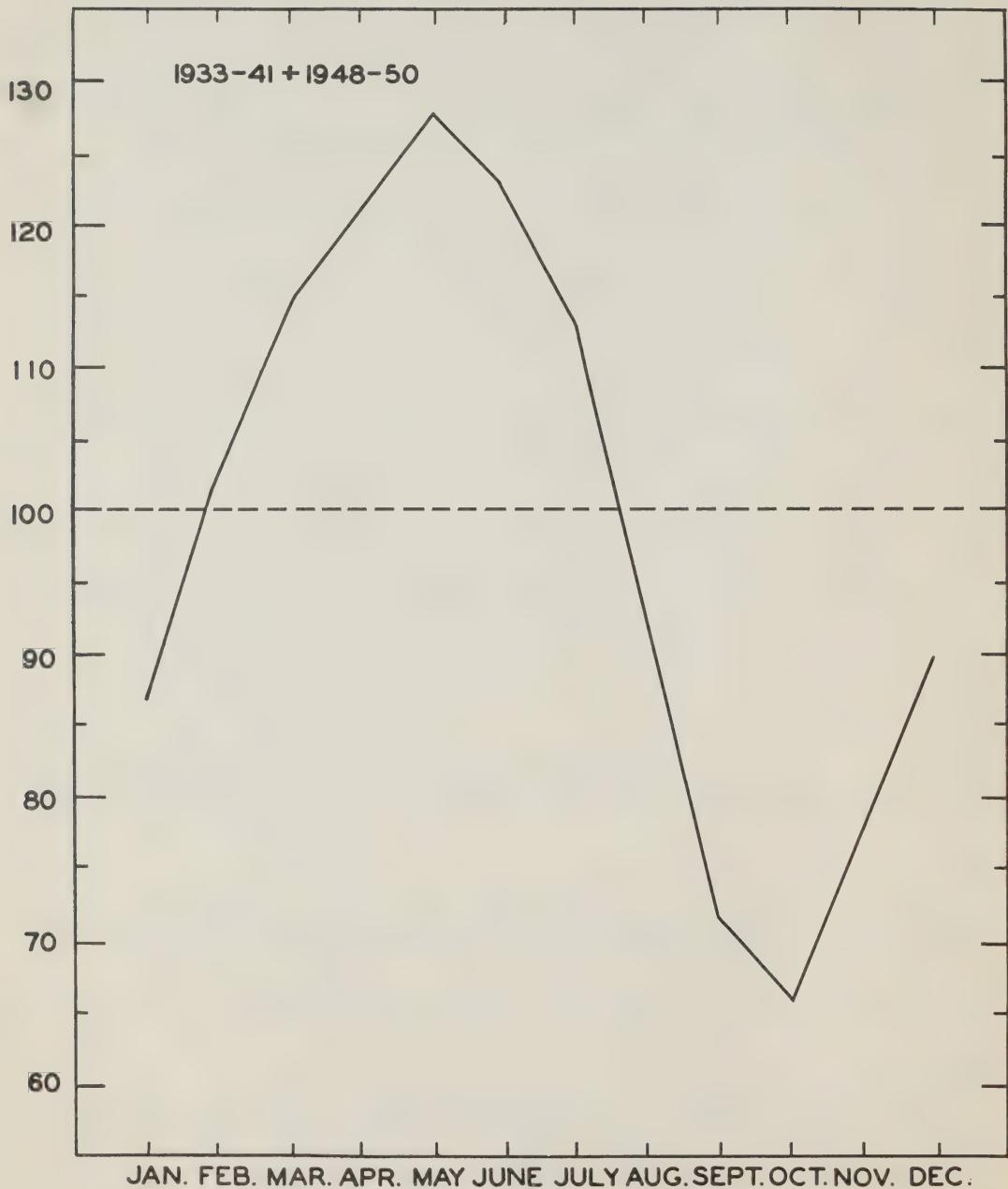


CHART 20.

TRENDS IN SEASONAL INDEX: COLD STORAGE HOLDINGS OF PORK.

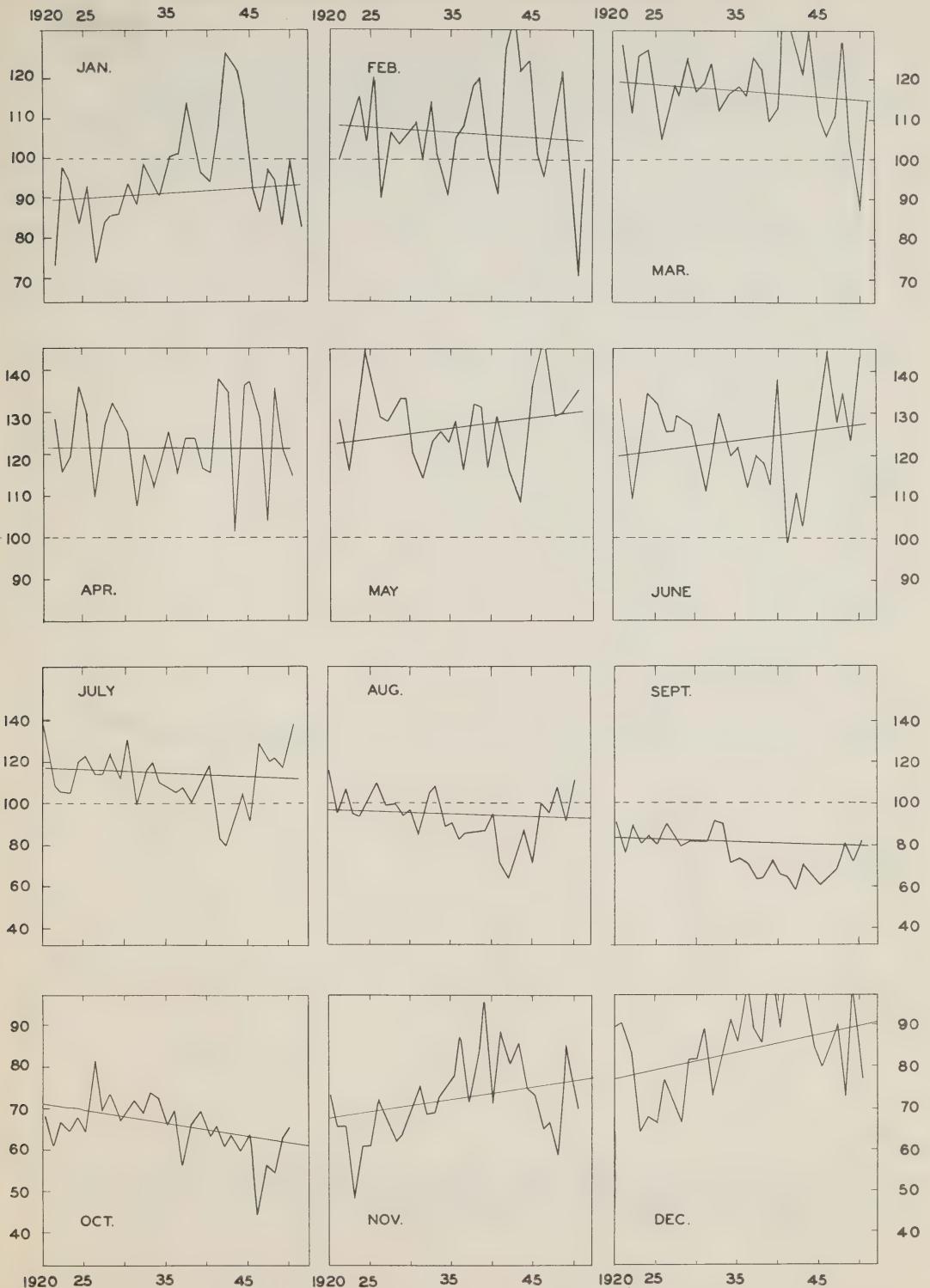


CHART 21.

SEASONAL INDEXES: 1. LIVE PRICE VEAL CALVES.
2. INSPECTED SLAUGHTER CALVES.

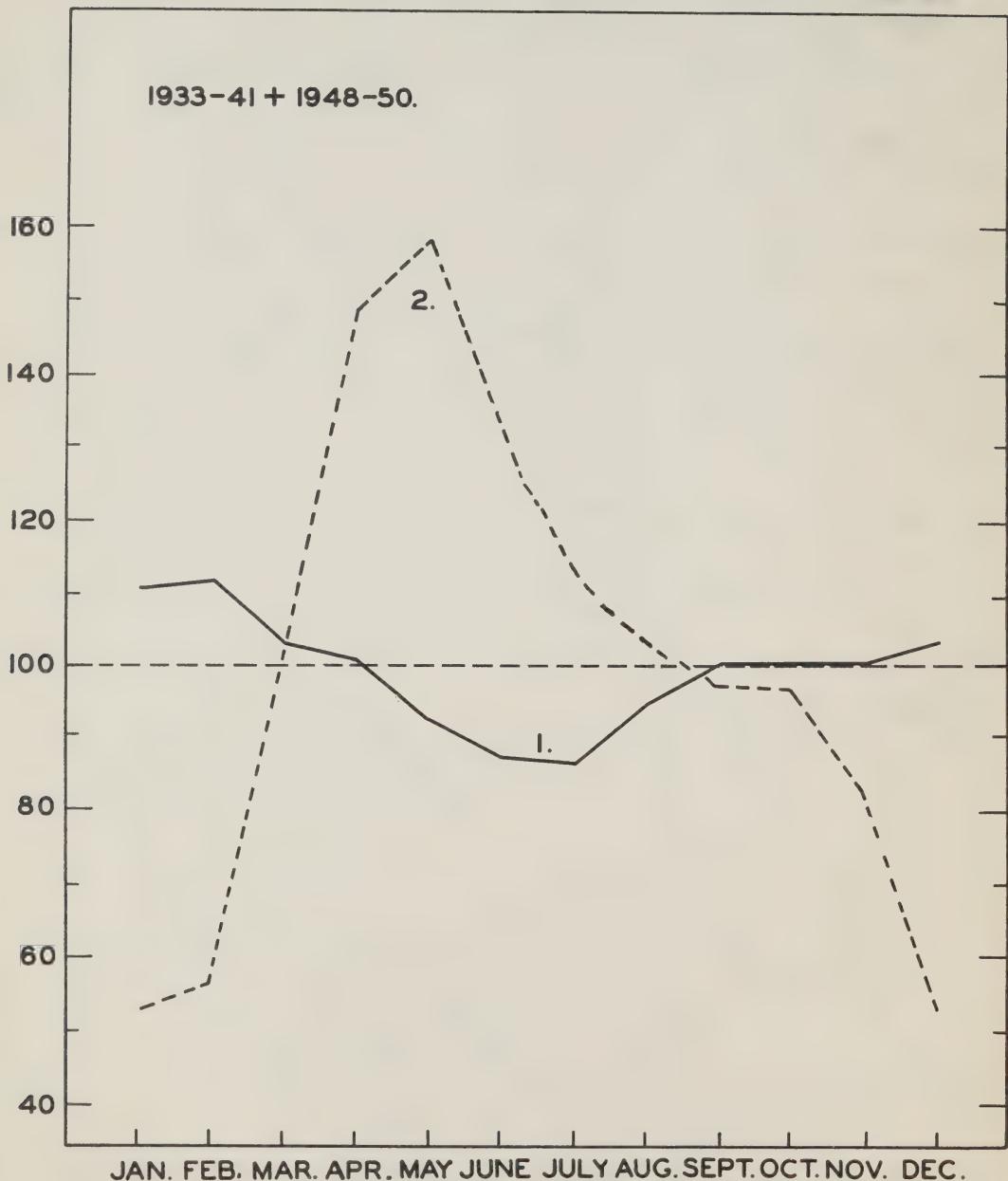


CHART 22.

SEASONAL INDEX: INSPECTED SLAUGHTER LAMBS

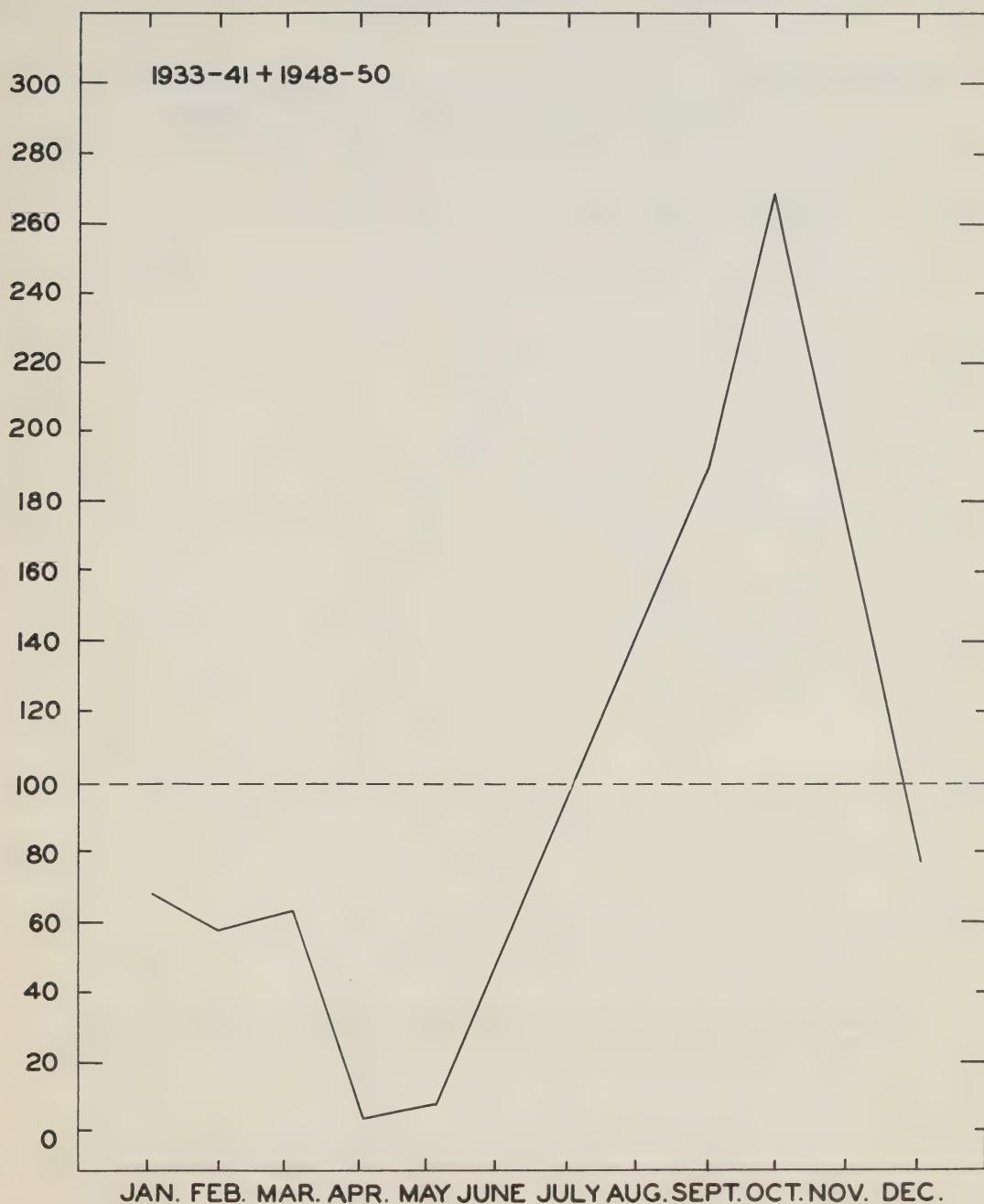


CHART 23.

SEASONAL INDEX: LIVE PRICE-LAMBS

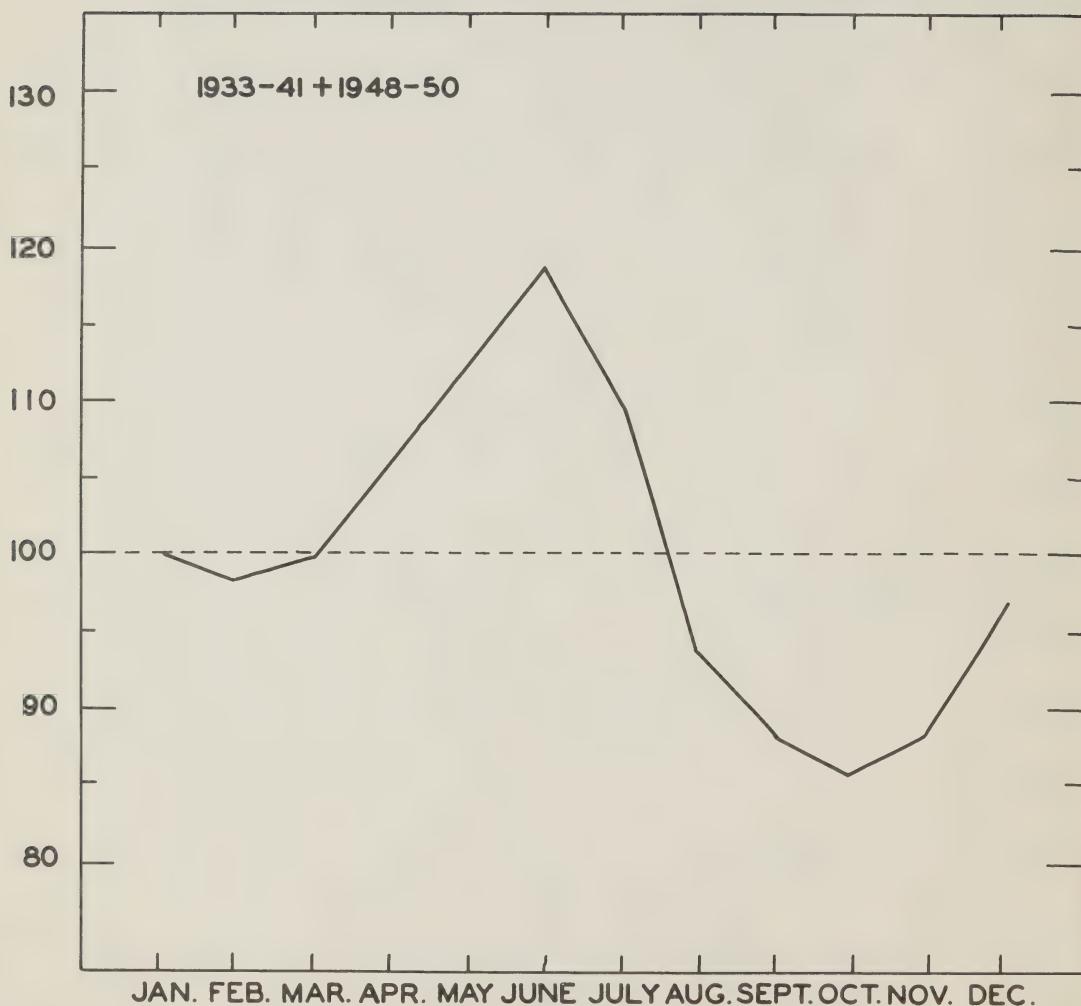


CHART 24.
TRENDS IN SEASONAL INDEX: LIVE PRICE OF LAMBS.

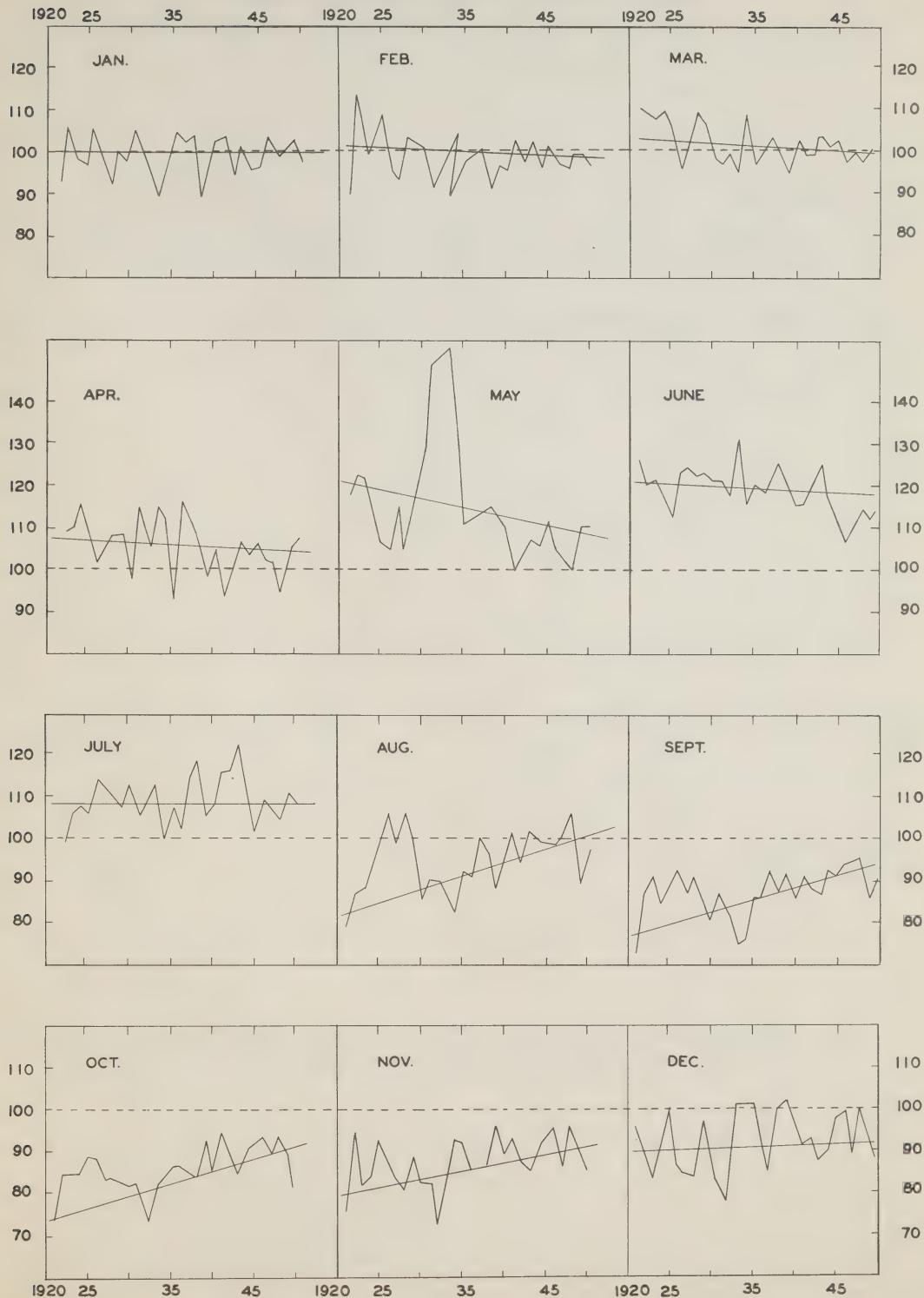
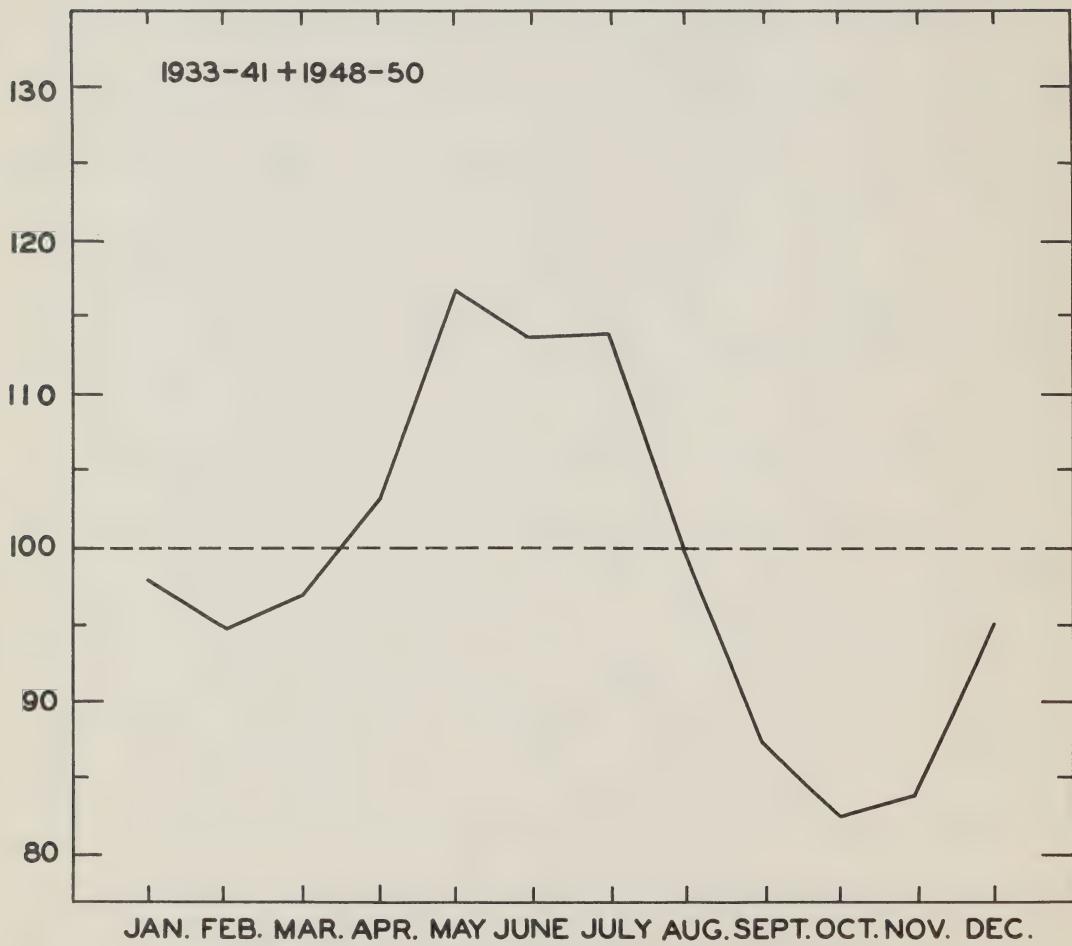


CHART 25.

SEASONAL INDEX: WHOLESALE CARCASS PRICE-LAMB.



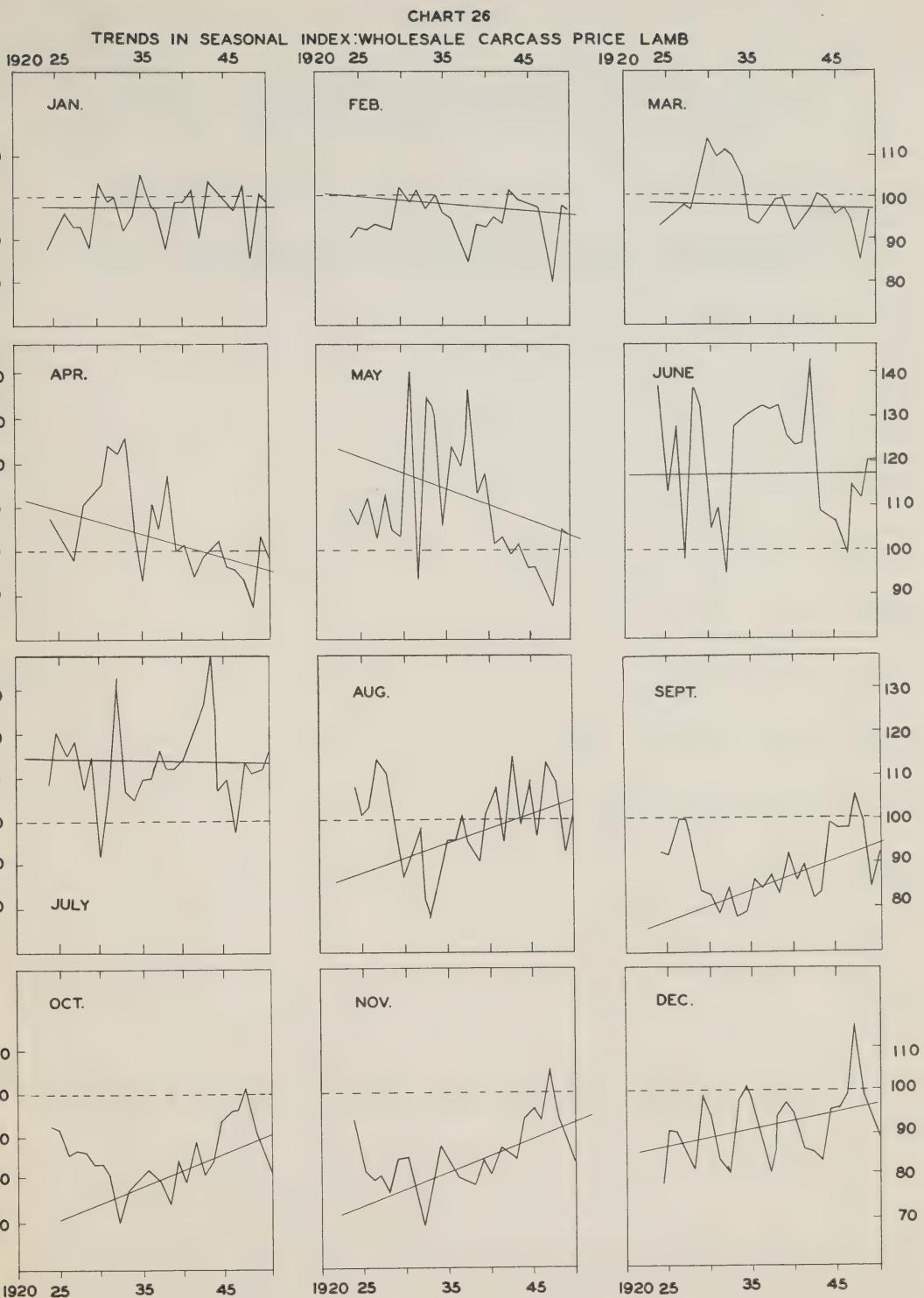


CHART 27

SEASONAL INDEX: PRODUCTION OF MILK IN CANADA

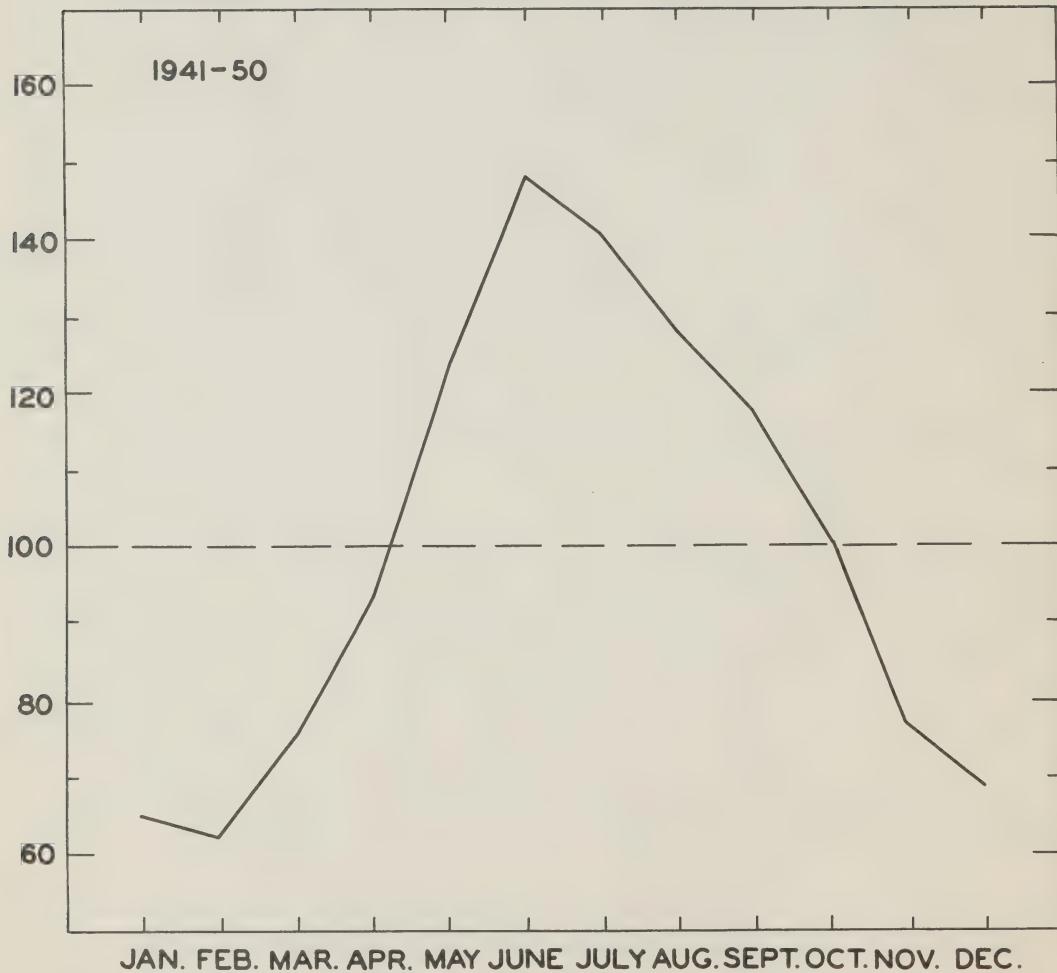


CHART 28

SEASONAL INDEXES: I. WHOLESALE PRICE OF BUTTER
2 PRODUCTION OF BUTTER

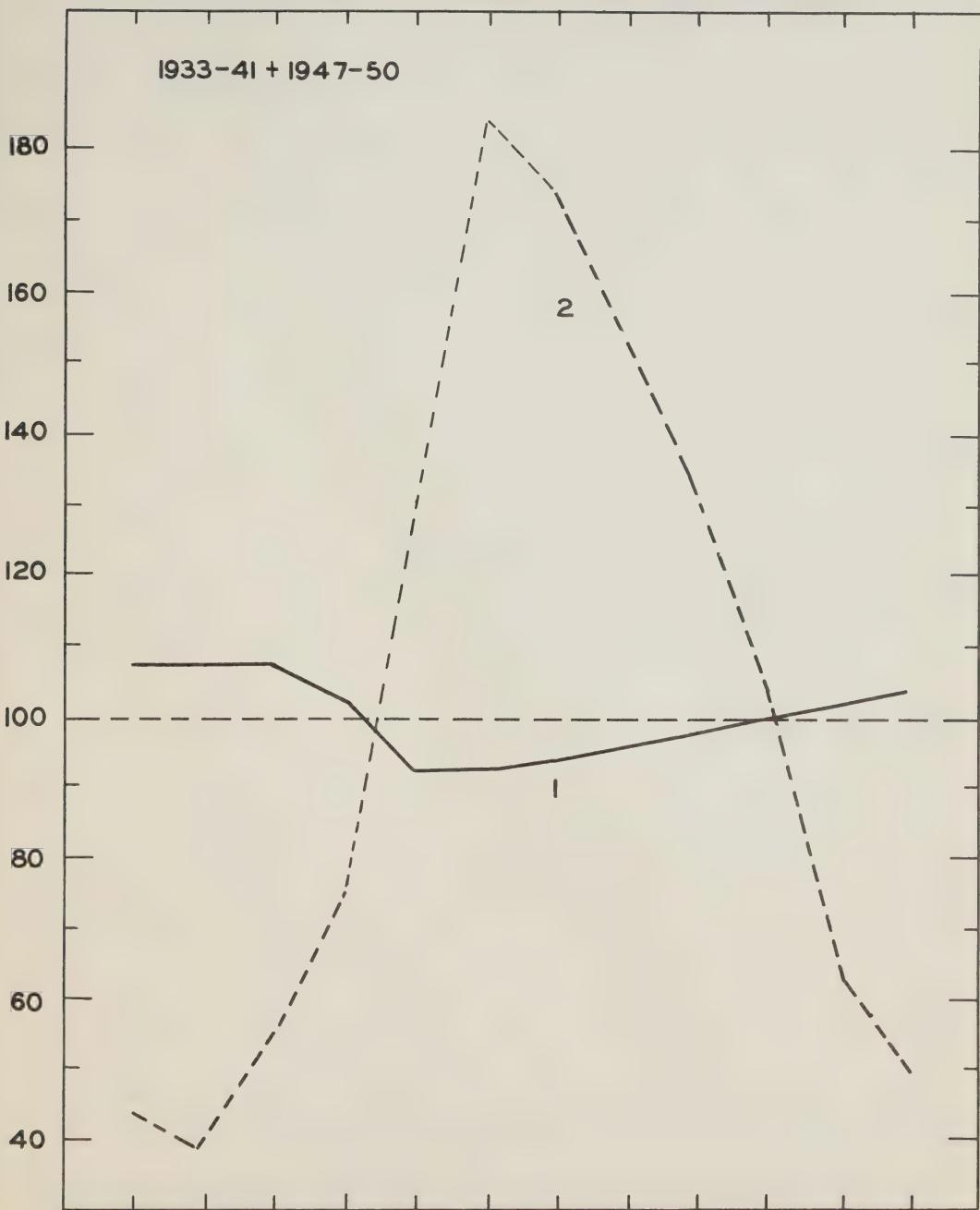


CHART 29.

SEASONAL INDEX: STOCKS OF BUTTER

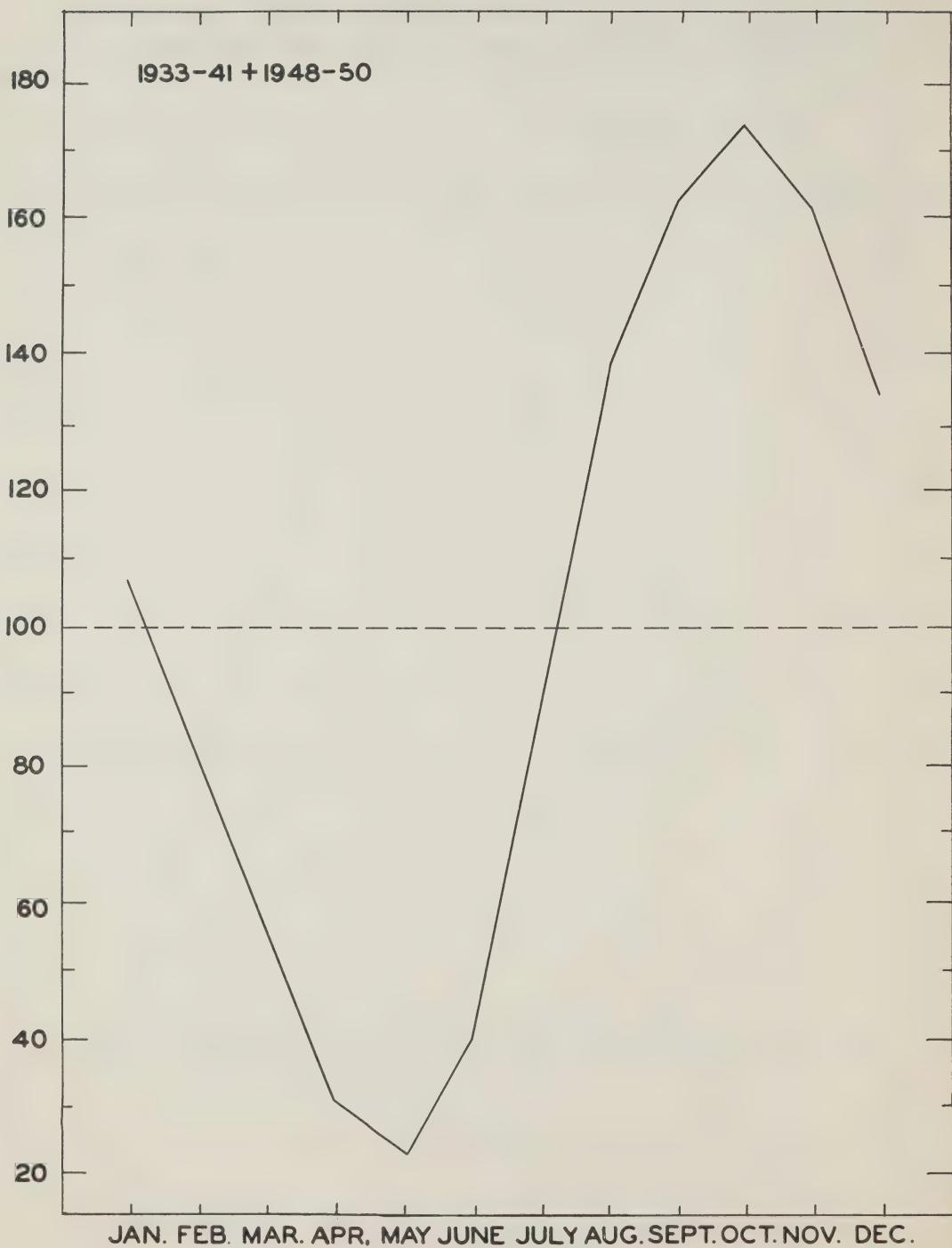


CHART 30.

SEASONAL INDEXES: WHOLESALE PRICE, EGGS, GRADE "A" LARGE

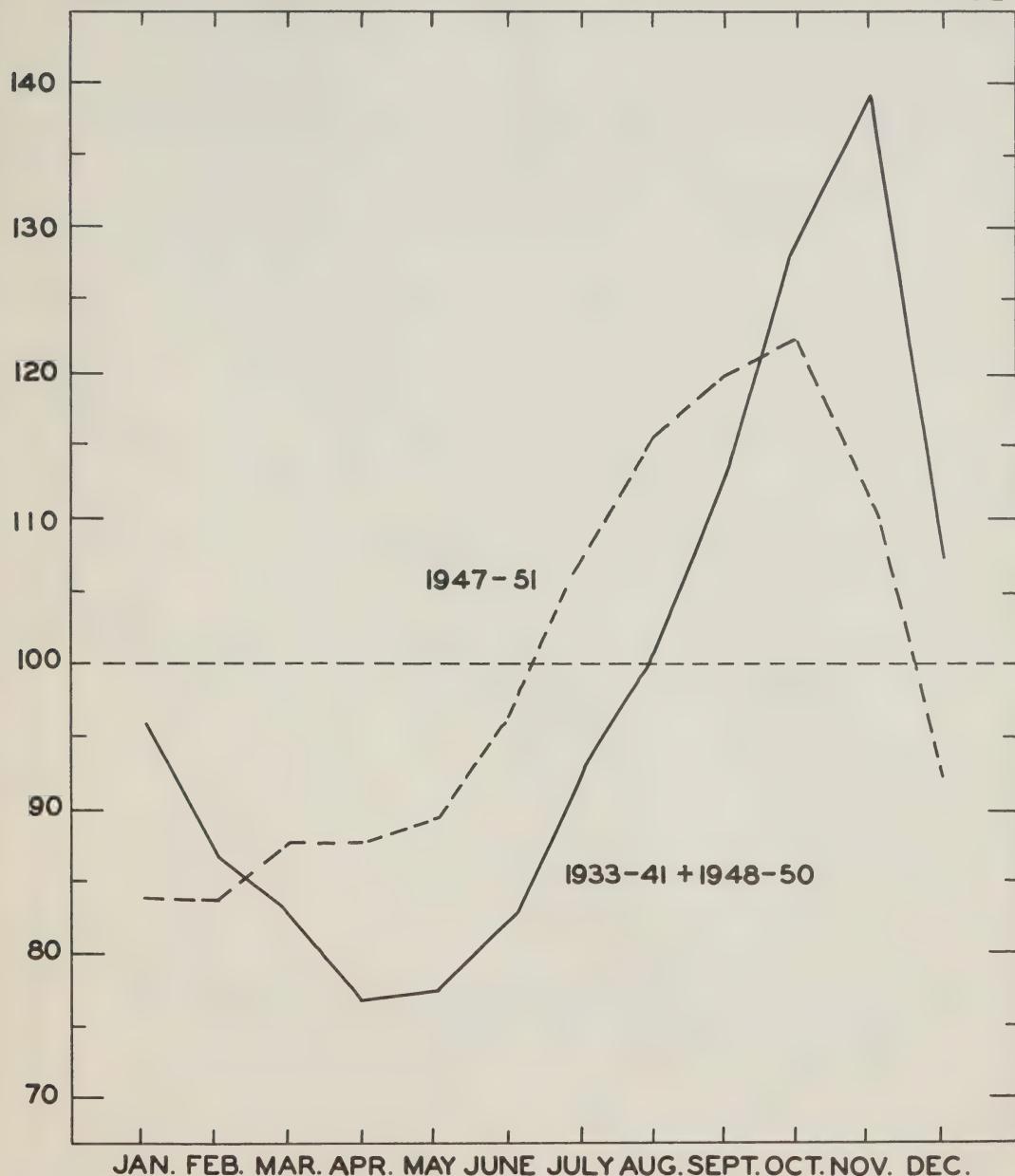


CHART 31.

TRENDS IN SEASONAL INDEX: WHOLESALE PRICE EGGS

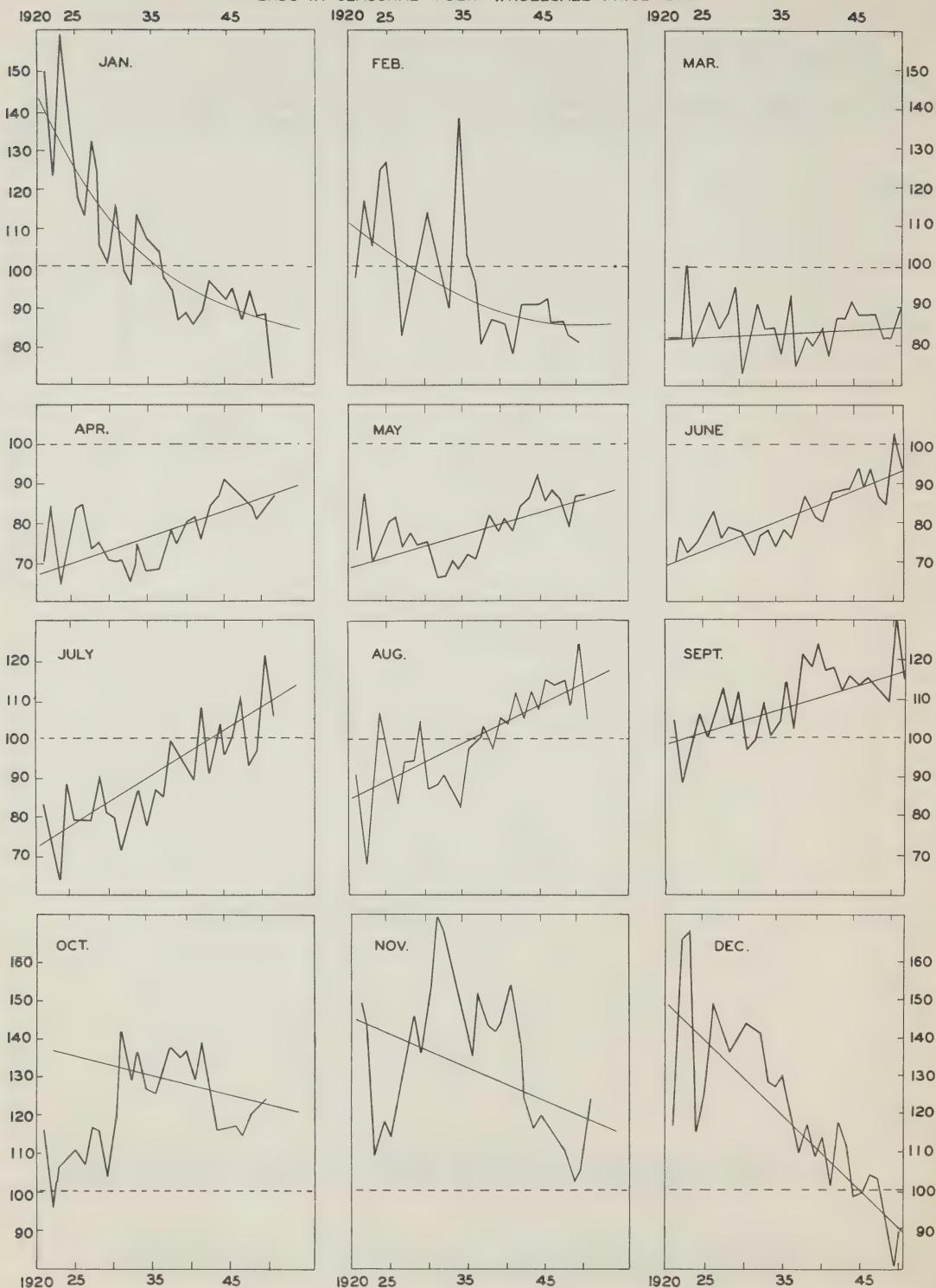


CHART 32.

SEASONAL INDEX: RETAIL PRICE OF EGGS—GRADE A LARGE
POST-WAR YEARS

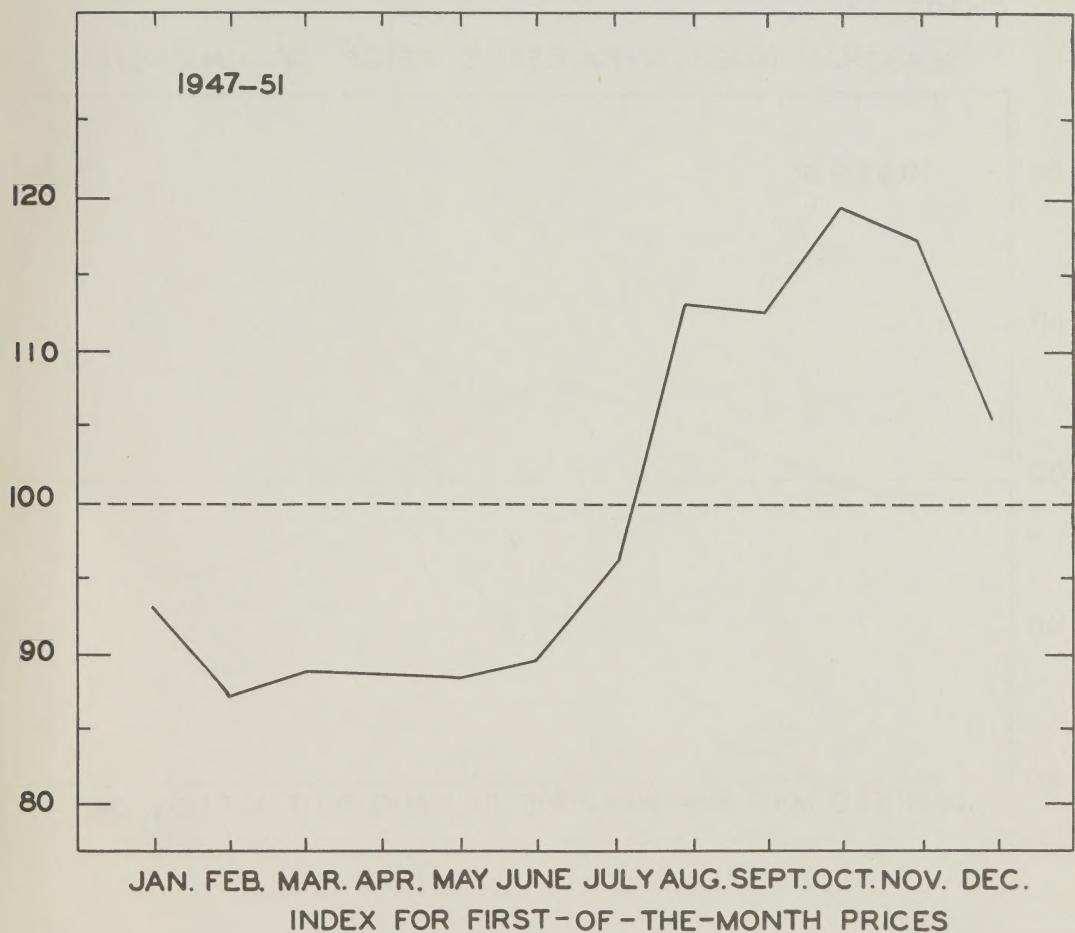
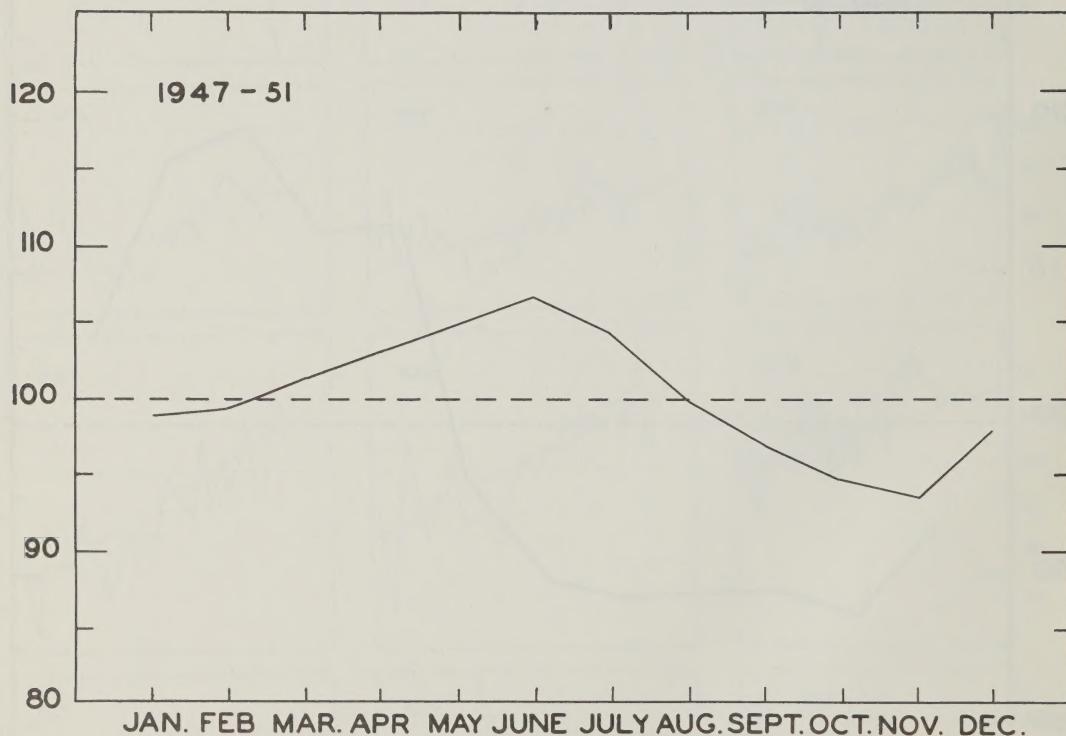


CHART 33.

SEASONAL INDEX: WHOLESALE PRICE OF CHICKENS.



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